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AMERICAN JOURNAL OF OPHTHALMOLOGY

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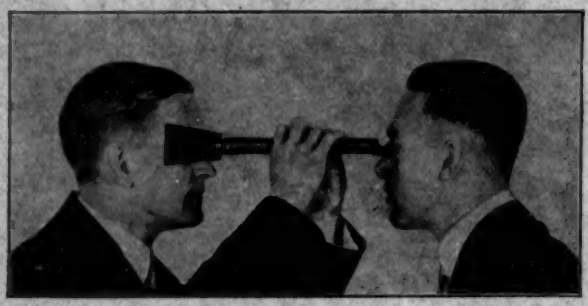

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AMERICAN JOURNAL OF OPTHALMOLOGY

Vol. 2 JUNE, 1919 No 6

CONGENITAL EYE CONDITIONS AFFECTING VISION OUT OF TWO HUNDRED THOUSAND TROOPS EXAMINED AT CAMP TRAVIS, TEXAS.

MAJOR A. B. MIDDLETON, M. C., OCULIST SPECIAL MEDICAL EXAMINING BOARD.

PONTIAC, ILLINOIS.

This abstract from the official report describes the conditions observed, with colored plate of the most unusual, and half-tone reproduction of sketches of some of the others. Authority to publish granted by the Board of Publication, S. G. O.

More than two hundred thousand troops were examined at Camp Travis, Texas, before the armistice was signed. Out of the eye cases referred to the Special Medical Examining Board, twenty-eighth had a congenital condition of the fundus or bulb causing a reduction of vision.

The cases were carefully sketched and the congenital defect painted in duplicate shades as per the water color drawing accompanying each history and description. The small number of congenital conditions affecting the bulb and fundus sufficient to reduce vision, taken from a large number of young men in the prime of life must not be misleading and give the impression that congenital eye changes are rarely met in civil life.

No doubt there were many afflicted with congenital eye conditions in this group of troops, who had sufficient vision to pass the regular examining board. The Local and District Boards prevented many from entering the army with insufficient vision, a certain percentage of whom had a congenital defect. These two facts explain the small percentage of cases found.

Time and space will not permit the discussion of each case separately, but the history and description gives all the details. It is strange to note, we found few duplicates.

An interesting thing in the history of congenital eye conditions that affect vision, is the fact that few of those thus afflicted have their eyes examined to determine the cause of poor vision. In this series of twenty-eight cases only one had consulted a doctor with regard to his eyes. Never having had normal vision, they do not realize the handicap from which they are suffering.

CASE 1. MULTIPLE SCLERAL ECTASIA. Private T. J. R., June 28, 1918. Denies specific history. Right eye has not given trouble other than the dimness of vision; did not have eyes examined by a doctor before entering the army; no history of receiving a hard blow over the right eye.

Examination. Age 22 years; white; vision O. D. 10/200; O. S. 20/20; no squint; tension normal; right cornea clear and free from scars; anterior chamber deep. Aqueous clear; iris free from adhesions and deposit of pigment. Lens clear: Vitreous clear and not fluid. Macula normal. Temporal side of the field dark. At the disc is a large circular coloboma of the choroid, the diameter of which is equal to twice the diameter of a normal disc. Directly below the coloboma of the disc, separated by an isthmus of normal choroid, retina and sclera, four millimeters wide, is a second circular coloboma of the choroid, two-thirds the diameter

of the one at the disc. The inferior retinal arteries and veins are displaced, passing directly downward from the disc, over both colobomas of the choroid. There is a band of exposed sclera four millimeters wide, within the circumference of each choroidal coloboma, with a sharply pigmented inner margin. The pigmented line is on the outer margin of the congenital hole in the sclera. The depth of each scleral ectasia or pocket is three diopters. On the floor of the scleral ectasia the retinal and cilio-retinal vessels pass over a smooth surface, bending forward over the margin of the scleral hole, continuing on a second, level surface of sclera, exposed by the choroidal coloboma. At the margin the retinal vessels bend forward to the normal level of the retina. The retinal vessels are on the bottom of each hole proving that the retina is intact even tho the choroid is absent. The larger vessels pass into and directly across each hole. The isthmus of retina and choroid between the two holes is normal, having a width of three millimeters. The chorio-retinal vessels are present on the nasal side of the disc but are absent on the temporal side. No choroiditis or choroidal ruptures. Considerable deposit of pigment in the choroidal coloboma area, but an absence of pigment in the bottom of the scleral coloboma or ectasia. The scleral coloboma in both places is larger at the bottom than the top, the vessels disappear before they pass out of the scleral pocket over the choroidal coloboma margin, the same as in an advanced case of glaucoma. The vessels in the upper half of the fundus are normal in size and position. See Fig. 1.

Case 2. Opaque Nerve Fibers. Private C. S., May 1918. Left eye has never given trouble other than reduced vision. Had not had the eye examined by a doctor, before entering the army. Denies specific history. No history of poor vision in the family. Parents not related.

Examination. Tension normal. No squint. Vision O. D. 20/20; O. S. 20/200; right fundus normal. Left cornea clear and free from scars. Anterior chamber deep. Aqueous clear. Iris free from adhesions and deposit of pigment. Lens clear and normal. Vitreous clear and not fluid. Vessels normal. Macular area normal. Disc normal in size and color except the upper half. Extending upward from the center of the disc is a fan-shaped splash of opaque nerve fibers one disc diameter in width over the retina. The opaque fibers cover the retinal vessels almost entirely, but do not follow their course. No choroiditis or rupture of choroid. Field of vision normal. No congenital pigment deposit.

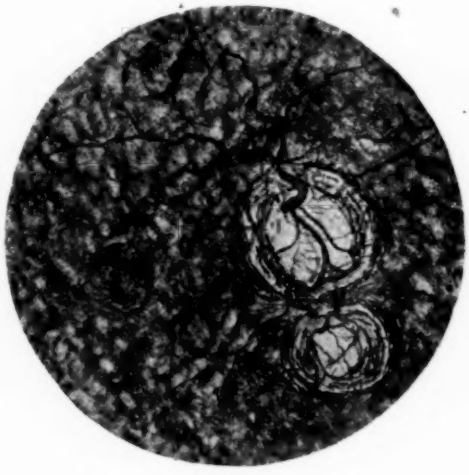

Fig. 1. Multiple Scleral Ectasia.

Case 3. Opaque Tissue on Optic Disc. Private S. H. E., April 5, 1918. Claims to have had syphilis early in life, but no symptoms or indications that the disease ever existed. Discharged from the army December 6th, 1917 (2nd draft) for beginning optic atrophy. During first induction this soldier malingered with regard to his eyes, pains in the body and several ailments, which he claimed were the result of syphilis early in life. After being in the hospital and held under observation for several weeks, was returned to his company. Discharge from the army for beginning optic atrophy, returned home, the local board reinducting him with the seventh increment. The same tactics were followed

in order to avoid the army on the second induction, stimulated with a recent discharge from the army due to optic atrophy. The supposed optic atrophy on a careful examination proved to be a duplicate congenital condition of each disc. The eyes never gave trouble in civil life.

Examination. Tension normal, vision O. D., 20/30; O. S. 20/20. Fields normal; each cornea clear and free from scars. Anterior chambers deep. Aqueous clear. Iris free from adhesions and pigment deposit. Pupils equal and normal in size, reacting normally to light and accommodation. Power of convergence normal; vitreous clear and not fluid. Vessels normal. No choroiditis. Lens clear. No change at the macular region. Discs normal in size but bulging resembling a pseudopapillitis. The nasal half of each disc shows ten or twelve elevated circular areas two millimeters each in diameter, giving the appearance of a white blackberry, these nodules do not extend farther than the margin of the superior and inferior retinal vessels as they pass over the disc, the temporal half of each disc being smooth, but bulging. The discs give a very white appearance, the nasal half with its opaque tissue confined to the disc, resembling in color an advanced case of optic atrophy. No pigment in or near the disc. The white elevated areas are confined to the disc and do not show the usual signs found in cases of exudative deposits. Fields normal. See plate VIII.

Case 4. Congenital Pigment in Physiologic Cup. Private C. M., July 5, 1918. Poor vision in left eye all of life. The eye has not given one moment's trouble other than reduction in vision. Has not had the eye examined by a doctor before entering the army. All members of family have good eyes. No specific history.

Examination. White; single; tension normal. No squint. Vision, O. D. 20/20; O. S. 10/200. Cornea of left eye clear and free from scars. Anterior chamber deep. Aqueous clear. Iris free from adhesions and deposit of pigment. Pupil slightly dilated reacting slowly to light and accommodation. Power of convergence reduced. Normal field of vision. Lens clear. Vitreous clear and not fluid. Vessels normal. No choroiditis or choroidal rupture. Disc normal in size and color. On the temporal side of the physiologic cup in the left disc is a densely pigmented triangular area. Each side of the triangle equals one-third the disc diameter in length. The pigmented area does not extend beyond the margin of the physiologic cup, but stops abruptly at its temporal margin. The densely pigmented area extends to the bottom of the physiologic cup. One apex of the pigmented triangle ends at the bottom of the cup, at the point where the central vessels enter the nerve trunk. The pigmented area is not elevated or nodular, but smooth and flat. No vascular disturbance near the pigmented area. No signs of a growth, like a melanotic condition might present. Cilioretinal vessels pass thru the pigmented area, which is nothing more than a congenital pigment deposit on the temporal side of the physiologic cup. See Plate VIII.

Case 5. Congenital Varicose Vessels. Private J. W., June 1918. Left eye has been weak all his life, but has not given trouble other than dimness of vision. Never had the eye examined by a doctor before entering the army. All members of family have good eyes. Specific history denied. No history of trauma.

Examination. No squint. Tension normal. Vision O. D. 20/25; O. S. 20/200. Field of vision normal. Cornea of the left eye clear and free from scars. Anterior chamber deep. Aqueous clear. Iris free from adhesions and deposit of pigment. Pupil normal, reacting to light and accommodation. Power of convergence normal. Lens normal. Vitreous clear and not fluid. Disc normal in size and color, as far as can be determined, there being a congenital varicosity of the retinal vessels in front of the disc. No evidence of arteriosclerosis. At the points where retinal artery and veins leave the disc, they are very tortuous, folding across the disc three times, extending forward

into the vitreous. The disc is not bulged. The veins are not compressed by the arteries. The vessels otherwise normal, continue in a normal position after leaving the margin of the disc. The varicosity is confined to the area in front of the disc. See Fig. 2.

Case 6. Congenital Pigmentation Left Macular Region. Private C. M. W., May 24, 1918. Age 23; occupation, farmer; single, white; left eye weak all of life; never had it treated or examined by a doctor; the eye has not given one moment's trouble other than

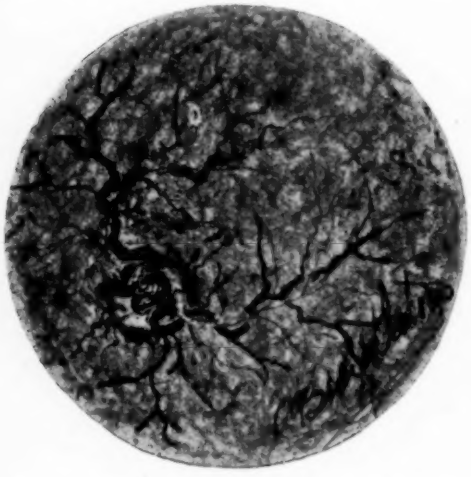

Fig. 2. Congenital varicose vessels of left disc.

dimness of vision. Denies specific history. No blindness or poor eyes in family. No history of a blow to the eye.

Examination. No squint. Tension normal. Vision O. D. 20/30; O. S. 3/200. Left cornea clear and free from scars. Anterior chamber deep; aqueous clear. Iris free from adhesions and deposit of pigment. Lens normal. Vitreous clear and not fluid. Vessels normal. Disc normal in size and shape. At the macular region there is a densely pigmented circular area three-fourths the disc diameter in width. The surface of the area is smooth, but mottled with very small whitish streaks one half millimeter each in width. The white streaks are not exudative but simply unpigmented retina showing between the heavily pigmented portion. Branches of the retinal vessels extending to the margin of the pigmented area, pass over the pigment. Large central scotoma. Pupil reacts to light and accommodation slowly. Power of convergence normal. No choroiditis or rupture of the choroid. No pigment deposits other than the area at the macula. See Plate VIII.

Case 7. Binocular Macular Hole in the Retina, Congenital Private L. A., (Col.) May 9th, 1918. Denies specific history. No mental symptoms present. No history of mental disease in the family. No history of having had a severe blow to the eyes or over the head. Weak eyes all of life, never had them fitted with glasses or examined by a doctor. One eye has always been as good as the other, neither one having given the slightest pain or discomfort other than the dullness in vision.

Examination. Tension normal. Vision O. D. 20/70. O. S. 20/200. Cornea clear and free from scars. Anterior chamber deep. Aqueous clear. Iris free from adhesions and pigment deposit. Pupils equal in size but slightly dilated reacting slowly to light and accommodation. Power of convergence reduced. Disc normal in size and color. Vessels normal. No rupture of the choroid or choroiditis. At the macular region of each retina is a slightly depressed symmetric circular area, the diameter of which is one third the diameter of the disc. The exposed choroid at the bottom of the hole is a dark mahogany red, color more or less mottled with a slight pigment deposit. The margin of the retinal hole is slightly pigmented giving the appearance of a faint halo. Small central scotoma in each eye. No white exudative specks which are usually present in cases of traumatic retinal hole, the result of hemorrhage at the time of accident.

Case 8. Congenital Opaque Tissue on Disc. Private A. P. E., May 2, 1918. Right eye has been weak all his life, but has not given one moment's trouble other than the dimness of vision. No specific history, or history of poor

vision in other members of family. No severe blow to the eye.

Examination. No squint. Tension normal. Fields not taken. Vision O. D. 6/200; O. S. 20/20. Right cornea clear and free from scars. Anterior chamber deep. Aqueous clear. Iris free from adhesions and pigment deposit. Lens normal. Vitreous clear and not fluid. Vessels normal. No choroiditis or choroidal rupture. Macular region normal. Disc normal in size and color, but on the nasal side of the disc between the forks of the retinal vein as it passes over the disc is a white circular spot, slightly elevated, two millimeters (apparent size of image) in diameter. No deposit of pigment or signs present to indicate that this might be an exudate. The elevated area is due to opaque white tissue confined to the disc, this case being one of those that represents a white blackberry appearance of the disc when the elevations are multiple. Left disc normal. Vascular system is not disturbed at the site of the white spot. Disc not bulging in appearance, which is the case where the spots are multiple. No opaque nerve fibers in the fundus.

Case 9. Binocular Pigmentation of Fovea Centralis. Private R. R. (Col.) May 15, 1918. Farmer; single; aged 24 years; had weak eyes all his life, one eye not much better than the other. Never went to school or had eyes examined by a doctor before entering army. Denies specific history. No trauma.

Examination. No squint. Tension normal; vision O. D. 20/200; O. S. 20/200. Cornea clear and free from scars. Anterior chamber deep and aqueous clear. Iris free from adhesions and pigment deposits. Pupils slightly dilated but equal in size reacting slowly to light and accommodation. Power of convergence normal. Vitreous clear and not fluid. Lens normal. Vessels normal but the fundus is not as deeply pigmented as is the rule with colored people. Field shows a large symmetric central scotoma in each eye. In the macular region in each eye, directly at the fovea centralis is a densely deposited pigmented spot, circular, one millimeter in diameter (apparent size on fundus image) surrounded with light halo one millimeter in width. Disc normal in size and color.

Case 10. Bands Extending Across Physiologic Cup. Private B. F. B. July 1, 1918. Right eye has been weaker than the left all his life, but has never given one moment's trouble, and has not been examined by a doctor before entering the army. Denies specific history; no history of trauma.

Examination. No squint. Tension normal. Vision O. D. 1/200; O. S. 20/20. Right cornea clear and free from scars. Anterior chamber deep and aqueous clear. Iris free from adhesion and deposit of pigment. Lens normal. Vitreous clear and not fluid. Vessels normal in size and location. Macular region normal with a bright foveal reflex. Disc normal in size and color with a large deep physiologic cup. Horizontally across the cup are two suturelike bands resembling silk worm gut. The upper band is bifurcated at the temporal end, the bifurcation extending upward to the side of the cup. These bands are given off below the exit of the central retinal vessels and are on a level with the disc. The normal lamina cribosa fibers can be seen plainly in the bottom of the physiologic cup. Field of vision not

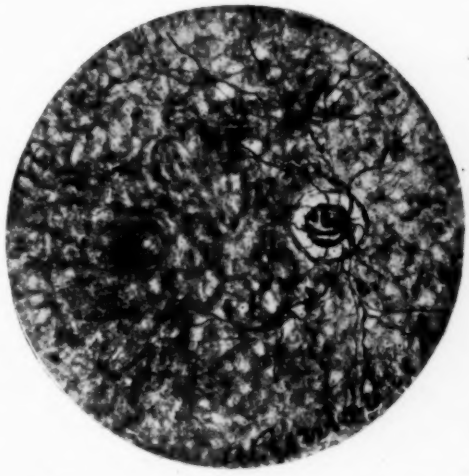

Fig. 3. Bands extending across physiologic cup.

taken. Left eye normal. See Fig. 3.

CASE 11. FOLD IN THE RETINA. Private M. P. (Mex.), June 26, 1918. Denies specific history; has not had a blow to eye. Right eye has been weaker than the left all his life, but never had it examined or treated by a doctor. The eye has not given the slightest trouble other than reduced vision.

Examination. No squint; tension normal; cornea clear and free from scars. Anterior chamber deep. Aqueous clear. Iris free from adhesions and deposit of pigment. Lens normal. Vitreous clear and not fluid. Vessels normal in shape and position. Disc normal in size and color. At the macular region there is a circular area of granular choroiditis of a dark red color one half the disc diameter in width. In the granular area are many small pigment specks one millimeter each in diameter giving a mottled appearance. Above the center of the macula are two densely pigmented circular spots two millimeters (apparent size) each in diameter, on the same level horizontally, three millimeters apart with no evidence of exudate. On the nasal side of the disc is a distinct fold in the retina, two millimeters (apparent) from the margin of the disc and two millimeters wide extending vertically toward and parallel with the nasal margin of the disc. The fold is a light gray color, free from pigment deposit along its margins, which is present in most cases of choroidal rupture. The retinal vessels leaving the nasal side of the disc pass over the retinal fold at right angles bending forward as they pass across the folded retina. No rupture of the choroid. No deposit of pigment or signs of hemorrhage at the site of the fold. Field of vision not taken. See Plate VIII.

CASE 12. DERMOID CYST OF THE LIMBUS. Private R. H. July 5, 1918. No tuberculosis in family. No history of trauma. Since childhood has noticed a round pinkish growth on the left eye, never painful or inflamed. Eye has not given one moment's trouble other than reduction of vision. No members of the family afflicted in this way. All have good eyes. No specific history.

Examination. Vision O. D. 20/40; O. S. 20/20. Tension normal; no squint; left cornea exposed, clear and free from scars. Anterior chamber deep. Aqueous clear. Pupil semidilated and kidney shaped, reacting to light and accommodation, but slow in convergence. Iris blue, free from adhesions and pigment deposit. Lens normal. Vitreous clear and not fluid. Disc normal in shape and color. Vessels normal. Macular region normal. On the nasal side of the cornea about "3:30 o'clock," on the limbus and slightly beyond the

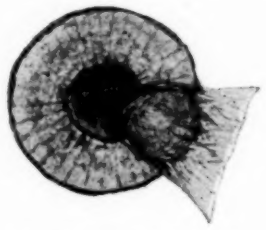

Fig. 4. Dermoid cyst of limbus (congenital).

pupillary margin is a circular, soft, movable tumor, one-fourth inch in diameter, of a pinkish gray color. The tumor is soft, giving the sensation under touch of hairs or varicose veins within the mass. No hairs growing from the surface. A band at the scleral margin of the tumor extends toward the outer canthus resembling a wide, thin pterygium. Many small vessels in the mucosa covering the tumor. Around the tumor in the cornea is a light colored halo. The tumor is freely movable but has a broad base and is six millimeters in thickness, which prevents the lids closing on the temporal side. Field not taken. See Fig. 4.

CASE 13. COMPLETE PUPILLARY MEMBRANE. Private, J. R. M. May, 1918. No specific history. No eye trouble other than the slight dimness of vision in right eye. No tuberculosis in family. No history of trauma. All members of family have good eyes. Has not had eyes examined by a doctor before entering army.

Examination. Vision O. D. 20/20; O. S. 20/30. Tension normal. No squint.

Brown eyes. Cornea clear and free from scars. Anterior chamber deep. Pupil normal size. Iris free from adhesions or deposits of pigment, but there is a thin congenital filmlike membrane, covering the whole right pupil area, attached to the iris equally around the whole margin of the pupil. The membrane is nearly transparent. Examination with the loupe is required, which shows a vertical slit extending from one side of the pupil to the other resembling a cat's eye. The slit is two mm. wide at the center, gradually coming together at each end near the margin of the pupil. Atropin dilated the pupil slightly in the horizontal direction, but not vertically. The opening in the pupillary membrane separated equal to twice its original width under a mydriatic. The distant vision is reduced under atropin to O. D. 20/200. The left pupil is free from membrane or pupillary bands. No signs of inflammation or choroiditis in either eye.

CASE 14. ECTASIA OF SCLERA. Private J. L., (Col.), July 18, 1918. Specific history two years; has been blind in the right eye all his life, but it has never given the slightest trouble except the dimness of vision. The eye has never been hit a hard blow; or been red and inflamed. An external strabismus of twenty degrees present that has existed since childhood.

Examination. Vision O. D. 1/200; O. S. 20/20. Tension normal. External squint 20 degrees. Right cornea clear and free from scars. Anterior chamber deep. Aqueous clear. Iris free from pigment deposit and adhesions. Pupil dilated, reacting slightly to light, but not to accommodation. No power of convergence. Lens normal. Vitreous clear and not fluid. Disc normal in shape and color. Vessels normal. Field not taken, power of vision too low. Below the macular area in the right eye is an elliptical shaped depression in the sclera three diopters deep. The hole is one and one-half disc diameter in length, and three-fourths of one disc diameter in width. The axis of the ellipse is up and in, toward the disc, at about the angle of eight o'clock. The retina dips down into and covers the bottom of the scleral opening, which is larger at the bottom than at the opening through the choroid. The retinal vessels pass down over the edge of the sclera into the scleral ectasia, disappearing the same as in the case of a glaucoma cup, appearing again, crossing the bottom of the hole making the same turns in their exit. Many small retinal vessels pass down over the margin of the hole, which is not sharp cut but rounded. There is no choroid in the depression, the choroid is very thin over the margin of the hole. The retina is considerably pigmented over the floor of the hole, but is not pigmented over the balance of the fundus. The temporal end of the hole contains a deposit of exudate and two deeply pigmented spots resembling apple seeds. Over them, extending from above, is a fanlike exudate covered with blood vessels. The handle end of the fan extends down into the hole, between the two apple-seed-like pigment deposits, attaching itself to the floor. The exudate and pigment deposit in the temporal end of the hole is the result of a specific choroiditis that has taken place in the congenital opening in the sclera. See Plate VIII.

CASE 15. DERMOID CYST. LIMBUS OF CORNEA. Private B. S. Dec. 7, 1918. Age 25 years; farmer; single; has had a small pink lump on the right eyeball all of his life. Never has given the slightest trouble. The sight is as good in one eye as is the other. No history of injury to the eye. Each member of his family has good eyes, and no growths upon them.

Examination. Vision O. D. 20/20; O. S. 20/20. Tension normal. No squint. Brown eyes. Exposed portion of right cornea clear and free from scars. Anterior chamber deep. Aqueous clear. Pupil kidney shaped, reacting to light and accommodation. Power of convergence normal. Iris free from adhesions and pigment deposit; lens normal. Vitreous clear and not fluid. Vessels normal. Macular region normal. Disc normal in size and color. No choroiditis or rupture of the choroid.

Field of vision not taken. At about "7 o'clock" on the limbus of the cornea is a light pinkish circular growth, three-sixteenths of one inch in diameter resting upon the cornea. Around this growth is a white halo resembling an advanced arcus senilis. The margin of the pupil appears to be displaced inward opposite the growth. The tumor is soft, no hairs growing from its surface. The broad base gives the appearance of being deeply attached to the cornea. The mucosa or conjunctiva over the growth is filled with many small vessels. Extending from the outer margin to the bulbar conjunctiva the growth spreads out into a wide band, like a thin pterygium. The eyelids close perfectly. No signs of a growth

Fig. 5. Dermoid cyst limbus of right cornea.

on the left eyeball. Not painful and never inflamed. See Fig. 5.

Case 16. Fuchs' Coloboma. Private B. E. S. May 3, 1918. Has never been able to see as well with the right eye as the left. The eye has never given a moment's trouble and never had it examined by a doctor. Never had a severe blow to the right or any kind of inflammation.

Examination. Tension normal. No squint. Vision O. D. 20/200; O. S. 20/50. Right cornea clear and free from scars. Anterior chamber deep. Aqueous clear. Iris free from adhesions and pigment deposit. Pupil normal in size, reacting to light and accommodation. Power of convergence normal. Vitreous clear and not fluid. Lens normal. Vessels normal. Macular region normal. Disc normal in color and shape, but directly below the disc is a crescentic coloboma of the choroid, slight yellow color and slightly depressed. The inferior retinal vessels pass over it, making a slight dip in their transit. No pigment deposit. No choroiditis or rupture of the choroid.

Case 17. Pigmented Scleral Nevus. Private C. T., July, 1918. Mexican; age 30 years; farmer; married; does not speak English. Interpreter states that soldier claims the black spot on the white of his right eye has been there all of his life, but is not painful and never has been inflamed or sore. No history of injury or severe blow to the eye. The eye has always been blind, never consulted a doctor with regard to the eye. General health good, works hard every day, has not lost any weight. No member of the family afflicted in this manner. No specific history. No tuberculosis in the family.

Examination. No squint. Tension normal. Right cornea clear and free from scars. Anterior chamber deep. Aqueous clear. Iris free from adhesions and deposits of pigment. Brown eye. Pupil normal in size, reacting slowly to light but not to accommodation. Power of convergence sluggish. Lens normal. Vitreous clear and not fluid. Vessels and disc normal in size and color. No choroiditis, or rupture of the choroid. Fundus dark and deeply pigmented, a condition that is often present in normal Mexican eyes. Left eye normal. Between lids of the right eye opposite the outer half of the palpebral fissure, on the surface of the sclera is a triangular pigmented area. The base of the triangle is at the limbus of the cornea, the apex extending to the temporal end of the palpebral fissure. The base of the triangle is three-eighths of one inch wide, one-half inch in length. The pigmented area is a dark brown color and not elevated or nodular. No disturbance of the vascular system over or near this area. The bulbar mucosa is elastic and not adherent over the nevus. The deposit is confined to the surface of the outer layers of the sclera. The base of the triangle extends beyond the limbus into the corneal tissue two millimeters. The choroid and retina opposite the pigmented area are normal. The pupils dilated equally with atropin.

CASE 18. RETINITIS PIGMENTOSA. Private H. B. F. History. "Have had good eyes all my life but cannot see as well after dark as other people, in fact can't get around without feeling my way with a stick. Several in family have weak eyes, but I don't know what is wrong with their eyes. I am the only one that cannot see after dark. Have had my eyes examined by eye doctors and told that I have night blindness. Father and mother not related; no intermarriage among ancestors." No specific or tubercular history.

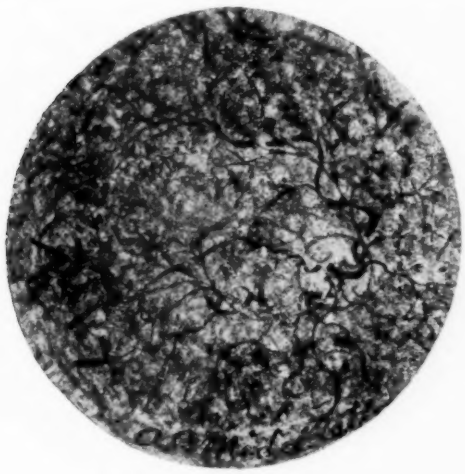

Fig. 6. Retinitis pigmentosa.

Examination. Age 22 years; single; farmer; vision O. D. 20/15; O. S. 20/20. No squint; tension normal; cornea of each eye clear and free from scars. Anterior chamber deep. Aqueous clear. Lens normal. Iris free from adhesions and pigment deposits. Vitreous clear and not fluid. Vessels and discs normal in shape and color. No choroiditis or rupture of the choroid. Pupils normal, reacting to light and accommodation. Power of convergence perfect. Field of vision shows the usual typical field found in cases of retinitis pigmentosa. On the surface of the choroid is a pigmented band completely surrounding the fundus, the extreme outer margin of the fundus being clear and free from pigment deposit. The pigment deposit is spindle shaped, several spindles in a cluster located in the anterior layers of the retina, the retinal vessels passing under the pigment deposits. Fig. 6.

CASE 19. COLOBOMA OF THE LENS. Private J. K. S. Has had weak eyes all his life; age 25 years; carpenter; married; eyes have never given the slightest trouble other than the reduced vision. Father living; good sight. Mother 58 years old, had a painful trouble with eyes for many years. The last seven years has been obliged to feel her way about the room. Three brothers all have good sight; one sister, age 35 years, has weak eyes; one sister died of appendicitis at the age of 16 years, had weak eyes; one sister has two children, one girl good eyes, one boy E. H., 11 years old, in the blind school, Austin, Texas. Mother's brothers and sisters have good eyesight.

Examination. No squint; tension normal. Vision O. D. 20/50; O. S. 20/20. Both corneas clear and free from scars. Anterior chambers deep. Aqueous clear. Pupils normal in size, reacting to light and accommodation. Power of convergence normal. Iris free from adhesions and pigment deposits, but tremulous, the right much more than the left. Vitreous clear and not fluid. Vessels normal. Disc normal in size and color. No choroiditis. No coloboma or rupture of the choroid. No coloboma of the ciliary body, iris, or retina. Right lens shows two coloboma notches on its lower margin. The larger notch at the position of "four o'clock," is a perfect semicircle, the apex extending four millimeters toward the center of the lens the base of the semicircle six millimeters broad. A second coloboma notch at the position of "six o'clock," also a semicircle, but smaller, extending three millimeters toward the center of the lens with a base of four millimeters. The colobomas are separated by a strip of clear lens two millimeters in width. The left lens has two incomplete colobomas which are nothing more than slight depressions in the lower margin of the lens. Lenses do not im-

prove vision. Field of vision not taken.

CASE 20. FUCHS' COLOBOMA BINOCULAR. Private B. E. S., May 3, 1918. Eyes have been weak all life, the right weaker than the left. Soldier, illiterate, never had eyes examined by a doctor before entering the Army. No specific history or history of tuberculosis. Eyes never pain or become inflamed. No weak eyes in family. Suffers considerably with headaches, the main reason for not attending school, which increased the severity of the attacks.

Examination. Farmer; 23 years old, single; no squint. Tension normal. Cornea of each eye clear and free from scars. Anterior chamber deep; aqueous clear. Pupils normal in size, reacting to light and accommodation. Power of convergence reduced. Iris free from adhesions and deposit of pigment. Lens normal. Vitreous clear and not fluid. Vessels normal in size and color. Each fundus has a coloboma of the choroid four millimeters (apparent) in width directly below, and connecting with the disc. Field of vision not taken. Retinoscopy under a mydriatic: Horizontal —3, vertical 0, in each eye. Corrected with +3 cylinder axis 90 gives 20/40 vision in each eye.

CASE 21. MONOCULAR GUTTATE CHOROIDITIS. Private L. A. L., April 30, 1918.

Has not seen well out of left eye, and it has been crossed all his life. The eye has not given one moment's trouble other than poor vision. All the members of family have good eyes; the patient only one that is cross eyed. No history of severe blow to the eye.

Examination. Left internal strabismus 25 degrees. Tension normal. Farmer. No specific or tubercular history. Age 22 years; vision O. D. 20/20; O. S. 1/200. Retinoscopy right horizontal +3, vertical +3. Left horizontal +2, vertical +2. Left cornea clear and free from scars. Anterior chamber deep. Pupil dilated slightly, reacting slowly to light and accommodation. Iris free from adhesions and pigment deposit. Vessels normal. No choroiditis or rupture of the choroid. Disc normal in size and color. At the macular region is a circular cluster of guttate choroiditis dots, seven in number, "two millimeters" each (apparent), in diameter, of a yellowish gray color, arranged in a wheel shape, the diameter of which is ten millimeters; one dot acts as the hub and is directly over the fovea centralis. The right fundus is free from guttate choroiditis. Field of vision shows a large central scotoma. Cannot rotate eye outward beyond the central line. See Fig. 7.

CASE 22. BINOCULAR GUTTATE CHOROIDITIS. Private J. A. R., May 1, 1918.

Fig. 7. Monocular Guttate Choroiditis.

No specific or tubercular history. Vision has been poor in both eyes all his life; but never had them examined or fitted with glasses. Eyes have not given one moment's trouble other than dimness of vision. Several members of the family have weak eyes, the cause not known.

Examination. Farmer; age 24 years; vision O. D. 5/200; O. S. 20/20. No squint. Tension normal. Cornea clear and free from scars. Anterior chamber deep and aqueous clear. Pupils larger than normal but equal, responding to light and accommodation. Power of convergence normal. Iris free from adhesions and pigment deposit. Vitreous clear and not fluid. Vessels normal. Discs normal in size and shape but both have a dirty gray color. At the

macular region is a cluster of grayish white choroiditic dots free from pigment deposit. The dots are two millimeters each in diameter, the cluster is circular and made up of fourteen. This area is equal in size to the disc. The center of the circle is over the fovea centralis. The fundus of each eye is a near duplicate. No rupture of the choroid or choroiditis other than the dots at the macula. Central scotoma each field of vision.

CASE 23. GUTTATE CHOROIDITIS BILATERAL. Private C. W. H., April 29, 1918. No specific or tubercular history in family. Never received a severe blow to either eye. Vision has been poor in the right eye all his life, but never consulted a doctor with regard to eyes. Many in the family have weak eyes, but the cause is unknown.

Examination. No squint. Tension normal. Vision O. D. 15/200; O. S. 20/25. Retinoscopy, right horizontal +4. Vertical +4. Left +1. Horizontal +1. Farmer; 23 years old; single. Guttate dots found in each fundus which are near duplicates. Cornea clear and free from scars. Anterior chamber deep. Aqueous clear. Pupils normal and equal, reacting to light and accommodation. Power of convergence slow. Lens normal. Vitreous clear and not fluid. Discs normal in size and color. Vessels normal. No rupture of the choroid or choroiditis except the circular cluster of guttate dots at the macular region of each fundus. The center of the circle is directly over the fovea centralis; this circle is made up of eleven grayish yellow dots "two millimeters" each in diameter, not pigmented and covering an area equal in size to the surface of the disc. The dots are smooth, located in the choroid. Field of vision not taken.

CASE 24. GUTTATE CHOROIDITIS BILATERAL. Private W. R. B., May 3, 1918. No specific or tubercular history in the family. No history of severe trauma. All members of family have good eyes. Vision poor in left eye all his life. The eye has not given trouble other than the reduced vision. Has not had the eye examined by a doctor before entering the service.

Examination. No squint or increased tension. Cornea of each eye clear and free from scars. Anterior chambers deep and aqueous clear. Left pupil slightly dilated, reacting to light and accommodation slowly. Power of convergence reduced. Iris free from adhesions and pigment deposits. Lens normal. Vitreous clear and not fluid. Vessels normal. Discs normal in shape and color. No rupture of the choroid or choroiditis except a circular area of guttate choroiditis in the macular region. The area of guttate dots is covered with about twenty-five smooth yellowish gray dots, "two millimeters" each in diameter, nonpigmented. The center of this area is directly over the fovea centralis and covers a space about the size of the disc. Field of vision not taken. Fundus picture the same in each eye.

Fig. 8. Binocular coloboma of iris.

CASE 25. BINOCULAR COLOBOMA OF IRIS. Private J. G., May, 1918. Mother claims that he had "cat's eyes" all his life, due to a scare that she had just before his birth. None in the family have anything of this kind. Parents were not of the same family. Eyes have not given any trouble except poor vision and people stare at them all the time. No history of trauma.

Examination. No squint. No specific or tubercular history. Tension normal. Cornea clear and free from scars. Anterior chamber shallow. Aqueous clear. Pupil of each eye keyhole in shape with the slot downward, the bottom of the sides coming together at the limbus. Iris blue, free from adhesions and pigment deposit. Pupil reacts slowly to light and accommodation. Power of convergence normal. Vision O. D. 20/40; O. S. 20/40. Vitreous clear and not fluid. Vessels and discs normal in size, shape and color. No

coloboma of the choroid, ciliary body, retina or lens. Pupil dilates slightly in all directions with homatropin. Fields of vision not taken. See Fig. 8.

CASE 26. MONOCULAR MICROPHTHALMIA. Private J. T. (Mex.), August, 1918. Right eye has always been blind and much smaller than the left. Vision in left eye 20/20; right eye has not given any trouble other than the blindness and appearance. Never had any inflammation or a severe blow to the right eye.

Examination. Mexican. Does not speak English; information gained through an interpreter. Right eyeball one-third smaller than the left. Cornea five millimeters in diameter, but clear and free from scars. Anterior chamber shallow, filled with clear aqueous. Iris very narrow, not responding to light. Homatropin produced slight dilatation. Lens clear. Not able to determine fundus condition. Vitreous not clear enough to see the disk or fundus. All motor muscles normal. No squint. No tension. No specific or tubercular history. None of the family troubled in this manner. Parents not relatives. Farmer, 26 years old; married; children normal eyes.

Fig. 9. Binocular sectional albinism of iris.

CASE 27. BINOCULAR SECTIONAL ALBINISM OF IRIS. Private E. J. (Col.), May, 1918. No specific history. Had white sections in the brown part of eyes all his life. Eyes never painful or become inflamed. Has not had them examined by a doctor. None in the family afflicted this way. No albinos in the family. Cannot stand light without squinting the eyes. Vision always poor in the left eye. No history of injury or tuberculosis.

Examination. Farmer; single; age 23 years; vision O. D. 20/20; O. S. 20/200. Tension normal. No squint. Cornea clear and free from scars. Anterior chambers deep and aqueous clear. Lens normal. Pupils normal and equal, reacting to light and accommodation. Power of convergence sluggish. Iris free from adhesions and deposit of pigment. In the iris of the right eye, which is a dark brown, is a white transparent sector six millimeters wide including the entire width of the iris at the angle of "eleven forty-five o'clock." Through the transparent sector it is possible to see the fundus and the outline of the lens with slight difficulty. With the exception of the one nonpigmented sector the remainder of the iris is one shade, and normal in color. The left iris has two nonpigmented sectors, three millimeters each in width, extending thru the entire width of the iris. One of the sectors in the left iris is at "two o'clock" and the other at "six," they are white and transparent, the same as the sector in the right eye. The pupils dilate easily and equally under atropin. The refraction is normal in each eye. Soldier squints with eyes all the time to avoid the light. Vitreous clear and not fluid. Vessels normal in shape and color. Disc normal. No choroiditis or rupture of the choroid. No coloboma of the choroid, ciliary body, iris, or lens. Fields of vision not taken. See Fig. 9.

CLINICAL OBSERVATIONS IN THE OPHTHALMIC SERVICE AT CAMP SEVIER, S. C.

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BATH, MAINE.

This account of the ocular conditions encountered in such a service is published under authority to publish granted by the Board of Publication, S. G. O.

The class of cases seen in the ophthalmic service of an army base hospital is somewhat different from the cases observed in civil eye clinics. The range of cases is more limited for two reasons: first, the ages of the patients are nearly alike, or have been during the period covered by this study, second, similar or nearly similar environment of the men narrows the field of possible ocular conditions.

From January 1, 1918, to November 1, 1918, the new cases admitted to the clinic for treatment have numbered 1953 or just under two hundred new cases per month. This does not include the many visits for routine vision testing, a part of physical examinations, nor does it include the officers, their families, nor members of the Army Nurse Corps, the records of whom are kept in a separate class for reasons of age, sex, living conditions, etc.

It may be of interest to speak of the refractive work. It indicates the number of young men who go without proper refractive work or who are not constant in wearing their correction. Many such were found, numbering very nearly fifty per cent of those applying for correction of refractive errors. The histories of these patients also demonstrate that excessive near work may not be the chief factor in sending the young hyperope to the ophthalmic surgeon. By far the majority of these cases came complaining of the effect of the wind and especially the sunlight upon the eyes. A proper refraction relieved the symptoms complained of. A study of the refractive work of all the camps will give us the refractive index of the young male American as a class. We did at Camp Sevier 839 refractions of all kinds. About fifty per cent of these had been refracted previously and slightly over ten per cent were still wearing their corrections. All refractive work was done under atropin or homatropin. Retinoscopic and ophthalmoscopic refractions were estimated in all cases and thoro going trial case work was done. The results were as follows:

14% accepted plus spheres
03% accepted minus spheres
10% accepted plus cylinders
03% accepted minus cylinders
53% accepted plus spheres and plus cylinders
06% accepted minus spheres and minus cylinders
11% accepted plus spheres and minus cylinders or minus spheres and plus cylinders.

It should be noted as well that very nearly thirty per cent of the refractive errors showed also an anisometropia of 0.75 D. or over.

CONJUNCTIVITIS. There have been 741 cases of acute conjunctivitis treated at this clinic. These include nearly four hundred cases treated, which were classed as epidemic. But this socalled epidemic coexisted with one of mumps and measles.

In the whole series the pneumococcus was the offending organism in a large percentage of cases. On the whole the findings from a bacteriologic standpoint are not materially different from the series reported by the author in the July number of the American Journal of Ophthalmology, page 480, except a slightly higher pneumococcus percentage, a lower number in which no organism was found, and double the percentage of Koch-Weeks infections.

The conjunctival diseases include, besides some chronic cases, eight cases of self-imposed traumatic reaction and two marked cases of vernal catarrh. In

one of the latter the hyperplasia of the conjunctiva entirely encircled the cornea and presented a decided elevation with a width of two to three millimeters.

PHLYCTENULAR CONJUNCTIVITIS was seen seven times, with an additional case which invaded the cornea.

TRACHOMA. Sixteen cases of trachoma have passed through our hands. By permission of the commanding officer we were allowed to keep cases of this disease in the hospital under proper regulation in order to carry out treatment. The so-called Bacillus bulgaricus treatment was tried thoroly in seven cases of chronic or quiet trachoma and upon two cases of the active type. Of the acute cases, both were seen when there was marked congestion, injection, pain and discharge. Pannus was marked in both cases. The treatment increased every symptom to such an extent that this method of treatment had to be discontinued. The cases were then treated with copper stick until the active symptoms subsided and the pannus disappeared when a shift was made to the Bacillus bulgaricus. Again every symptom increased, requiring discontinuance once more. The tablets used were fresh, kept in a cool place and powdered daily. The plan of treatment in these, as well as in the chronic cases, was that described by Crawford, in his paper read before the Nashville Academy, May 16, 1916, entitled "Fourteen Cases of Trachoma or Granular Lids treated with Bacillus bulgaricus" and an article by the same author in the Annals of Ophthalmology of October, 1917, Vol. XXVI., No. 4, page 557. As implied, the treatment in acute cases was not satisfactory, quite the contrary, for the injection and edema increased, the discharge increased, the pain and discomfort were worse and the pannus enlarged under this medication. The treatment simply had to be abandoned after all the trial safety would allow. The seven chronic granular cases were under treatment from three to four months with the freshly powdered tablets. In no case did we see active excitation of the disease after or during treatment. The treatment was not unpleasant to the patients but that is as far as it goes. In no case was improvement seen either before or after manual expression of the granules. In two additional cases the diagnosis of which was doubtful at first, but which were held under observation, we found some slight temporary improvement during the quiet and restriction of the observation and treatment period. Upon return to the wind, smoke, sun and dust of their active army life these cases quickly relapsed. As a result of these few cases treated and studied it is safe to state that there is no field for this treatment in the army. The cases which showed any improvement in our hands have been small. The improvement is temporary. Even if the results were better the time required is too long to be of practical value in the army. The treatment is detrimental to acute cases. As a result of the experience at Camp Sevier, it is believed that the treatment has no influence upon the trachoma.

CONJUNCTIVAL CONDITIONS. One of the striking conditions constantly met with in great numbers in these young men was pinguecula and pterygium. That age is no barrier to these two conditions in the south and middle southwest was manifest at this clinic. It was seldom that these patients came to the hospital for the manifest condition. On the contrary they came for refractive errors.

Two patients were seen here who presented a rather rare condition, namely blood channels of the conjunctiva. One was a decided blond, the other just as positively a brunet. The history in both cases was unimportant especially in that there had been no history of injury, no foreign body nor other conjunctival change. These "vessels" have been present in one case for a year and in the other for a year and a half. With the channels were also present enlarged veins which were tortuous. Adrenalin was used to get the effect and to demonstrate whether or not there was active injection present. The drug contracted the vessels but not the channels. A section of the

conjunctiva was removed in both cases and submitted to the laboratory for examination and report. The reports were similar and to the effect that the specimen presented vessels with only endothelial cells as vessel walls together with apparently enlarged vessels of normal structure. The normal as well as the abnormal vessels both lay deep and superficial in the conjunctival tissue. In places the channels showed the lumen as flattened septa-like slits lined with the same endothelium cells between these and fibrous tissue. These cases were similar to the section exhibited by Lang at the Royal London Ophthalmic Hospital on April 27, 1905, as reported in the American Encyclopedia of Ophthalmology, Vol. IV, page 3073.

There has probably been less gonorrheal conjunctivitis in the army than one would expect. Our cases numbered five. Each was correctly diagnosed by the virulent symptoms. The laboratory confirmed the character of the infection by smear and culture in each instance. The treatment employed was as follows: continual cold packs, silver nitrate 2% once daily, flushing of the eye every twenty minutes night and day with boric acid, saturated solution, with argyrol used as a float every hour, protection of the unaffected eye, light diet, continual rest in bed and attention to the bowels. Under the above treatment all cases were germ-free in a week and ready for duty soon after. In no case did the infection reach the sound eye. No complications were present upon the first visit nor developed after treatment began.

Hordeolum and chalazion were common. Nothing of interest occurred in connection with the lid cases.

One case of long standing symblepharon came for treatment because of the irritation and discomfort produced by exposure to the wind and dust of the outdoor life. The adhesion was complete, of the lower lid, the external two-thirds. The attachment was at the corneo-scleral junction and directly outward to the outer canthus. Conjunctival flaps were brought down from above. The flaps healed in place readily, producing a very satisfactory result. The patient went to France with his organization free from symptoms.

STRABISMUS. There have been forty-one operations for strabismus to date. The majority came to the clinic for relief of the disfiguring effects. In some of these the opportunity to train the muscles after operation was short or did not exist.

The squint cases were classed as follows:

	Number
Strabismus convergens .....(28)	
Monocular	16
Alternating	12
Strabismus divergens .....(11)	
Monocular	3
Alternating	6
Secondary to tenotomy internal recti	2
Strabismus verticalis .....(2)	

All of the patients were between 19 and 25 years of age except one who was 31. The perimetric deviation was from 30 to 55 degrees. In all cases the onset was before the sixth year of life. Glasses had been, or were being worn by but three cases. The glasses and the refractive status were of little practical value as only one was affected or benefited more than 5 degrees by glasses. Eleven of the convergent squint cases had evidently a "working" fusion faculty, as binocular single vision developed after operation. Seven of the divergent type also resulted in binocular single vision. One of the divergent group was converted from a constant alternating squint to one of the occasional type. In three cases of the convergent type a second operation was required in order to secure a satisfactory cosmetic result. In the first class the operation consisted of one of the muscle shortening operations with graduated tenotomy of the opposing muscle in twenty-five of the twenty-eight cases. In the three remaining cases of this group a shortening only was done.

All the divergent cases were operated by complete tenotomy of the external recti muscles. The vertical cases were treated by a graded tenotomy of the superior rectus muscle of the affected

side. Of the two patients with a divergent squint secondary to a tenotomy of the internal recti, one was of four years standing, the second of twelve. The first one presented a left eye, proptosed, with a wide palpebral fissure and limited internal rotation. The capsule of Tenon was opened. The rectus was found and was brought forward to or in advance of its normal position and attached by scleral sutures. The capsule above and below the muscle was advanced as well. In the second case double complete tenotomy of both internal recti had been done, which had resulted in a wide divergence. The operation in this case consisted of opening the capsule on both sides, finding the atrophied muscles and bringing them into proper position and, by scleral suture, fixing them there as indicated in the previous case. Both cases after four months were as follows: from a cosmetic standpoint straight eyes. In the second case we find 4° of exotropia for distance and 11° for near. The binocular single vision in the first case is not constant but up to the present has improved slowly. The excursions are limited in inward duction in both cases. There would seem at this time to be a fair degree of permanency and, considering the length of time the old tenotomized muscles have been out of use, the results are satisfactory.

Lacrimal Disease. Five patients have been operated for obstruction of the lacrimal duct with chronic dacryocystitis. Both sides were operated in three of the cases. Two patients, one with single and one with double obstruction, were treated by the trichloracetic acid method of Gifford. Three treatments by this method were all that were needed to be convincing that the method was out of place in the army. The time from duty was long in each instance. While the end results were all that could be expected the resulting scar was as marked as by extirpation and the extra time for the wound to fill up with granulation tissue made this method less satisfactory. All other cases were operated by extirpation. The end results have been satisfactory and all cases but one have been ready for duty in from five days to one week. The writer can see no comparison between the methods used here.

Corneal Disease. It should not be passed without comment that there have been no cases of ulcus serpens or interstitial keratitis seen at this clinic. Considering that the clinic has been the place of treatment for well up to a hundred thousand young men of all classes, the above statement seems remarkable.

Several cases of dendriform and simple ulcers were treated but require no remarks.

A very interesting and unusual case of lisciform keratitis was under treatment. The onset and course was typical and uneventful at first. It was not possible to find a clue to the cause except a positive history of syphilis of six years' standing, but the laboratory findings were negative to the Wassermann reaction. At the height of the clinical course there appeared, opposite the central area on the posterior surface of the cornea, a perfectly pearl-white nodule, fixed and very small. The general reaction in the eye was not marked and there were no evidences of iris or uveal involvement; the iris remaining clear and mobile up to this point. On the fifth day after the appearance of the nodule the central area bulged forward slightly. Pressure was applied but the next day the cornea perforated and the anterior chamber emptied. The eye now began to be somewhat painful. From the first visit of this patient fluorescein was used daily but no abrasion of the corneal epithelium was found. Following the perforation of the cornea a very small tortuous sinus thro the cornea stained. It required magnification to see this well. This sinus remained open for four days even under pressure. At this time and following the closure the general reaction and pain were greater, and a mild low-grade iritis or iridocyclitis developed which gradually resolved as the corneal condition began to take on the characteristics of the more usual form of the disease. The terminal condition is

now what is to be expected from disciform keratitis, namely a permanent opacity, faded, with the discs less distinct. All the indications as described by Fuchs were present, the added element being the nodule on the posterior corneal surface and the perforation.

INJURIES. One of the most unique of accidents was a discission of the lens by a safety pin. A soldier, who worked in the shoe repair shops, pulled a pair of shoes from a line. The shoes were fastened together by a safety pin. The pull opened the pin and it hit the eye with enough force to cause the following injury. The point entered the left eye at about 2 o'clock and 3mm. inside the corneoscleral junction, proceeding down and in. The point first hit the lens capsule 2 mm. below the center of the lens, then the lid action in closing applied the force to the long arm of the lever which brought the point of the pin almost directly up, opening the anterior lens capsule for fully 3 mm. Swelling of the lens was prompt and so pronounced that it was followed by a rise in tension. Linear extraction was done. The eye at no time suffered more reaction than if a sterile instrument had entered the globe.

Another case of contusion of the globe was followed by a severe hemorrhage into the anterior chamber, with blocking of the filtration angle and an increase in tension. This was evacuated by opening the anterior chamber and was followed by a second collection of blood which had to be evacuated a second time. There was no injury to the posterior segment of the eye, there was no detachment or tearing of the iris tissue which could be discovered, and the lens was intact.

MISCELLANEOUS. The close association and perfect *coördination between the different services* in a base hospital, especially the Head Section and X-Ray Laboratory, have made it possible to do thoro investigative work in the focal infection cases and place the ocular conditions where they belonged regarding their etiology. The operative work of the dental service deserves recognition for prompt and thoro-going abolition of dental defects which served as causes of ocular pathology. The nose and throat service has been thoro and active in eliminating sinus and nasopharyngeal foci. The cases of ocular disease traced to dental or nasopharyngeal foci of infection have been about evenly distributed between the reflex neuroses and active inflammatory processes. Sinus infections have produced the majority of the muscular and asthenopic symptoms while apical abscesses, tonsilar infection and active ethmoidal infection have caused the majority of the inflammatory changes in the ocular structure. In eleven cases of iritis or iridocyclitis abolition of abscessed tooth roots caused an immediate resolution in the eye symptoms. One case of active exudative choroiditis was traced to an extensive involvement of the ethmoid cells and frontal sinus. The cases of unstable muscle balance, asthenopia, blepharopasm and accommodative deficiency have been much harder to trace and place exactly. Service conditions demand that soldiers be returned to duty with as little loss of time as possible, therefore in these cases the different departments worked together and at the same time. Ocular equilibrium was established by nasal or throat treatment in seven cases after proper and thoro going refraction had failed to relieve the symptoms, and this without altering the refractive correction. The same is true in one case of tooth impaction. In no case did the operative work on the teeth or nose and throat cause an increase in the ocular symptoms.

A summary of the *syphilitic conditions* of the eyes is being made by Captain James M. Blackwood, M. C. The end results in these cases have not been so satisfactory as they might have been. The cases affecting the uveal tract have presented the so-called quiet type and have progressed to a considerable extent before being seen by the ophthalmologist. Treatment of such cases is needed over a considerable period of time and observation over a much longer time still. The constitutional treatment of the syphilis seemed to give slow results in the cases of long

standing and it should be strongly emphasized that the ocular treatment should be just as active, thoro and vigorous as tho the general disease was not known. Especially must this be true for the reason that very active general treatment may increase the local reaction in the eye. There has been one such case here. This was in a late case where full doses of arsphenamine or one of the similar preparations was used. An immense amount of work must be done before the definite relationship of syphilis to eye diseases is placed on a stable foundation, especially the influence of general treatment and the type of constitutional treatment best suited to different phases of ocular pathology.

A considerable variety of *fundus lesions* have been seen. These may be classed for our purpose, into the active cases and the non-active or old cases. Of the active class there have been seven cases of optic neuritis, eleven of choroiditis, four of neuroretinitis, one of retrobulbar neuritis, two of hyalitis and two of choked disc. The old cases were more numerous and for the most part were seen in applicants for refractive corrections; simple optic atrophy seven, secondary optic atrophy five, pigmentary retinal degeneration six, familial optic atrophy four, central choroiditis eight, disseminated choroiditis six and rupture of retina one.

Malingering has been constantly present in one of its many classes or varieties. Much has been said and written on this subject, which has become a rather deep study at present. It seems to the writer that too much classification is confusing. He prefers to divide them into two main groups: The positive group which would include all cases who with intent, "manufacture" their condition or complaint without a basis or ground work for such a complaint, and this without respect to the mental or physical type of the malingerer. Then a negative class who often do have a ground upon which an exaggeration can be used to their advantage, or those who for fear do not fully realize that they are trying to evade duty. All such cases, of whichever type, must be treated as individuals. The author has found nothing short of wonderful the sight-restoring influence of treatment which is not pleasant or is more disagreeable than the "blindness," or "pain," or "neuralgia" or whatever they complain of. Therefore, in the second group especially and in some of the first group, silver nitrat, one or two per cent put into the conjunctival sac, without a local anesthetic, has worked like a charm. After three to six such applications the patients will usually and gladly demonstrate that they can see "lots better," or are less sensitive than when they applied for treatment. The cases are not a few in which the vision has improved (?) from 20/100 to 20/20 or 20/30 under such treatment.

A field which has been much neglected has been a study of the eye findings in the soldiers sent to the hospital for nervous and mental examination. Under the present orders to the effect that all men who seem unstable, hard to handle and excitable be sent to the psychiatrist, there has been a wide field of study of the eye conditions in these border-line cases. Such a study may have an important bearing on the early diagnosis of mental states, especially the functional psychoses. That this work has not been undertaken is due to the fact that there have not been ophthalmologists enough on duty here, to attend to the routine work of the eye department and find time for the extensive observation along these lines at the same time. This work has been recently undertaken and should yield valuable results.

TUBERCULOUS IRIDOKERATITIS—SOME FEATURES IN ITS PATHOLOGY.

CAPTAIN FRED T. TOOKE, C. A. M. C.

MONTREAL, CANADA.

This is a report of the histologic findings in four cases subjected to microscopic study, with comment upon the significance of the appearances observed. Read at the fifty-fourth annual meeting of the American Ophthalmological Society.

Iritis, perhaps more than any other form of ocular disease, has manifested a modification in its classification in comparatively recent years. Even including that evanescent issue, conjunctivitis and its bacteriology, no branch of the subject has made more actual advance than the study of iritis. The text-book of less than two decades ago taught that lues was responsible for 75 per cent of all patients suffering from iritis, and that so-called rheumatism, gonorrhea, tuberculosis, and trauma had to scramble for the balance.

The Wassermann reaction, the complement-fixation test, the careful examination of the sources of autogenous infection, teeth, tonsils, accessory nasal sinuses, and bowel, have modified the classification percentage of earlier days to a very appreciable degree. It is questionable if the figures of Hirschberg, who quotes 12 cases in 60,000, and Terson, 2 in 30,000 eye cases, would stand in the light of our present knowledge. The masterly work of de Schweinitz on uveitis, read before a recent International Ophthalmological Congress, would support such a challenge.

With a preconceived endeavor of exhibiting some of the tuberculous manifestations of the disease I have been peculiarly fortunate, during the past few years, in having material supplied me manifesting tuberculous processes in the iris with other associated features of the disease.

I would, at the outset, record my thanks to those of my colleagues who have by their contributions, made this paper possible.

The pathologic manifestations of this subsection of iritis are no less varied than the alterations of our point of view clinically and etiologically of iritis itself. The pathologic manifestations have naturally many features in common with other forms; on the other hand, each has its own peculiar or particular distinguishing feature.

CASE 1.—Material supplied by Dr. J. W. Stirling, Royal Victoria Hospital, Montreal.

Mrs. G., aged thirty-five years, married. Active, but poorly nourished, and with a marked family history of tuberculosis. A history of trauma of the right eye fifteen years earlier, the condition of inflammation requiring three months to subside. Present attack had been in progress for three weeks before she decided to consult Dr. Stirling. The cornea was steamy, or semi-opaque, the condition being more intense at certain segments, especially in the deeper tissues. Details of the iris could not be determined, and there was marked pericorneal injection.

There was a slight hypopyon but no acute pain. Later the hypopyon became more manifest, and the infiltration of the cornea more intense, with the presence of what appeared to be deposits on Descemet's membrane. There was a general rise of evening temperature to 99.2°; tension was low.

A paracentesis of the cornea was done, and a clot of organized exudate was removed from the anterior chamber without complication. Rapid progress followed this procedure, all signs of inflammation subsided, and in two days' time she was discharged from the hospital.

The specimen supplied resembled a particle of pus or slough. It was irregular in shape, of a yellowish-white color, and of a firm or solid consistence, not disintegrating when immersed in fluid. It measured approximately 6x2 mm. Sections were made in paraffin.

On examination by low power the section appears as a ribbon-like band, curved as though one side had been in contact with the inner surface of the cornea. It consists for the most part of two types of cells. The structure is of a network of new connective-tissue fibers, which are in fairly close apposition at one or two points, but at others the intercellular spaces are fairly well defined. The stroma of connective tissue is most dense anteriorly, bounding that part of the band the curvature of which would appear to conform to that of the adjacent cornea. Scattered through the stroma are quantities of white blood-cells which are distinctly more numerous as one proceeds backward (Fig 1.).

Fig. 1. Case I. Stroma of new connective tissue fibres most dense anteriorly. Scattered thru stroma are innumerable leukocytes and several tubercles best noted in posterior portion of the section (low power).

On examination by higher power one frequently observes that these leukocytes are so numerous as to ccupy the field completely. They are of the small mononuclear or lymphocyte group, although some polymorphonuclears as well as occasional large mononuclear blood-cells are present. At the end of the section behind the anterior stroma of connective tissue the lymphocytes have formed definite tubercles. They are round, and their periphery is bounded by a dense aggregation of small mononuclear leukocytes. The tubercles consist otherwise of large epithelioid cells, which occupy the center of each tubercle. Numerous giant cells are present. (Figs. 2 and 3.)

Although actual necrosis or caseation can hardly be said to have occurred, the cells most centrally placed have begun to show evidences of degeneration, being distinctly shrunken in size and contour. Their cytoplasm stains decidedly less distinctly than the cells more peripherally situated. Several sections were stained for tubercle bacilli, but none could be demonstrated.

An especially careful examination was made by high-power magnification for the detection of endothelial cells, which cover the anterior surface of the iris and line the cornea. That none of these cells could be found, and that the section is quite free from pigment cells, with which the iris is more or less infiltrated during chronic inflammation,

precludes the possibility that a superficial nodule has sloughed away from the iris and has formed a second focus of inflammation in the anterior chamber. A more reasonable conclusion would be that of a subacute or chronic inflammation of tuberculous origin, where the exudate particularly from the ciliary processes, consisted largely of lymphocytes, later to coalesce and form tubercles, which subsequently break down, rather than to treat of them as pus cells, as found in an acute hypopyon iritis. The action of light, penetrating a moderately clear cornea, may, in a measure, have arrested the progress of the disease in the anterior chamber, allowing a definite encapsulation of tubercules and lymphocytes more anteriorly to take place.

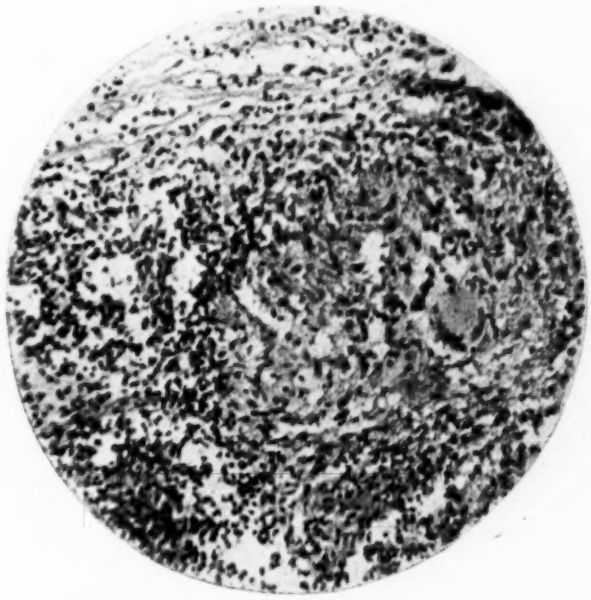

Fig 3. Case I. Section through a tubercle. Infiltration consists mostly of lymphocytes and a few large mononuclear cells and polymorphonuclears. Epithelioid cells and several giant cells also evident (high power).

Case 2.—Material supplied by Dr. Richard Kerry, Western General Hospital, Montreal.

I. R., a young English girl, aged eighteen years, complained of pain and redness of the left eye with intolerance of light. On examination the cornea at first suggested a condition of a superficial interstitial keratitis. There were areas of grayish streaks which tended to coalesce and to become more dense, with apparent roughening of the corneal epithelium. Under palliative treatment the eye became worse, infiltration of the cornea more intense, pericorneal injection more apparent, and the iris studded with a series of small grayish nodules. There were numerous posterior synechiae, the pupil dilating but slightly. There was an associated condition of cervical adenitis, presumably tuberculous; evening temperature, 99.2°.

The anterior chamber was opened on two occasions and iodoform powder introduced; iodoform emulsion was also administered hypodermically. The eye was subsequently enucleated by Dr. Kerry, as it was practically sightless, owing to corneal involvement and to the cataractous condition of the lens incumbent on the generalized posterior or ring synechia of the iris.

The globe was fixed and hardened in the usual way and subsequently embedded in celloidin. The section

shows very little evidence of acute or subacute inflammation at the corneoscleral margin, and the vessels are not excessive in number or altered histologically. There is no apparent infiltration about the walls of the blood-vessels, and the corneal epithelium shows no manifestation of edema or areas of exfoliation. Bowman's membrane is intact. Thruout the substantia propria there are innumerable areas of infiltration, which are most numerous near the limbus of the cornea. Each individual area is small, and does not appear to occupy more space than that of the single corneal cell, or at most of two cells. At no point do these assume a rounded or miliary appearance. The infiltration consists for the most part of small mononuclear leukocytes. There is no evidence of giant cells or of caseation in the cornea.

Descemet's membrane shows no presence of punctate bodies on its endothelial surface. There are areas where dense bands of adhesions have extended from the iris to Descemet's membrane, and where the latter has been ripped away by inflammatory bands extending from it to the anterior surface of the iris. These bands consist of inflammatory connective tissue cells, of various forms of leukocytes, in some instances with giant cell association, typical anterior synechiae.

The tear or separation of Descemet's membrane I interpret as mechanical, probably the result of opening the anterior chamber for the introduction of the iodoform. The iris is markedly infiltrated with large and small mononuclear leukocytes, as well as with some polymorphonuclears, to such a degree that details of the iris stroma and of its component vascular arrangement cannot be determined. Definite tubercles are scattered over the anterior surface of the iris, mostly over the pupillary margin. These consist of fibrinous material and of lymphocytes, with occasionally epithelioid cells, and others

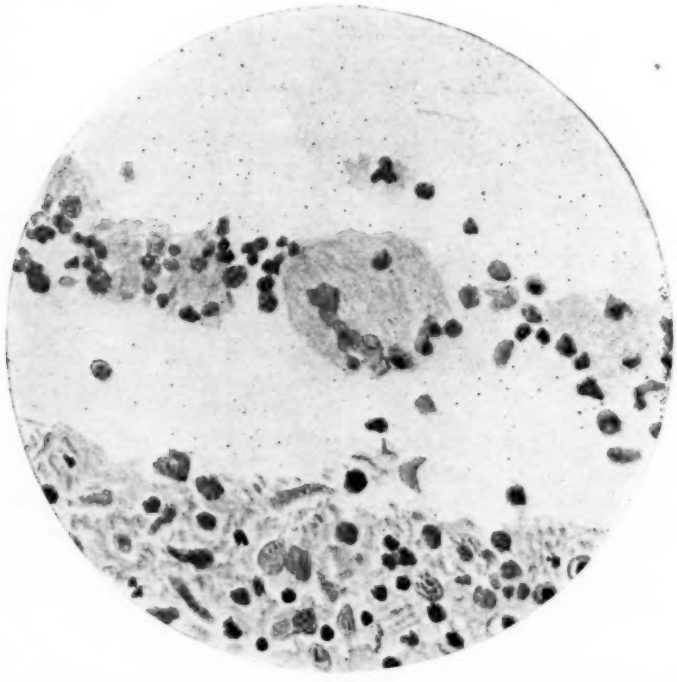

Fig 3. Case I. Practically same as Fig. 2, showing giant cells, leukocytes, fibrinous exudate, and endothelial cells lying free in the anterior chamber. (Oil immersion 1/12.)

in which an early stage of necrosis may be said to have begun. Giant cells are present. There are no evidences of tubercle about the filtration angle, altho one can be detected posteriorly midway between the pupil and the root of the iris (Fig. 4).

The pigment layer of the iris is distinctly disintegrated, and is thrown off into the posterior chamber. It has been collected at certain foci as definite masses, and when plastered down to the anterior lens capsule forms dense posterior synechiae, particularly about what was once regarded as the pupillary margin. At a greater distance from the pupillary margin these synechiae are less dense, and an iris bombe is clearly shown, with occlusion of the filtration angle.

Cataractous changes have occurred in the superficial lamellae of the lens cortex. A mild degree of infiltration is noticed about the ciliary processes, with numerous erythrocytes lying free in the vitreous chamber. The retina and choroid show no associated inflammatory changes. Tubercle bacilli could not be demonstrated in the tissues.

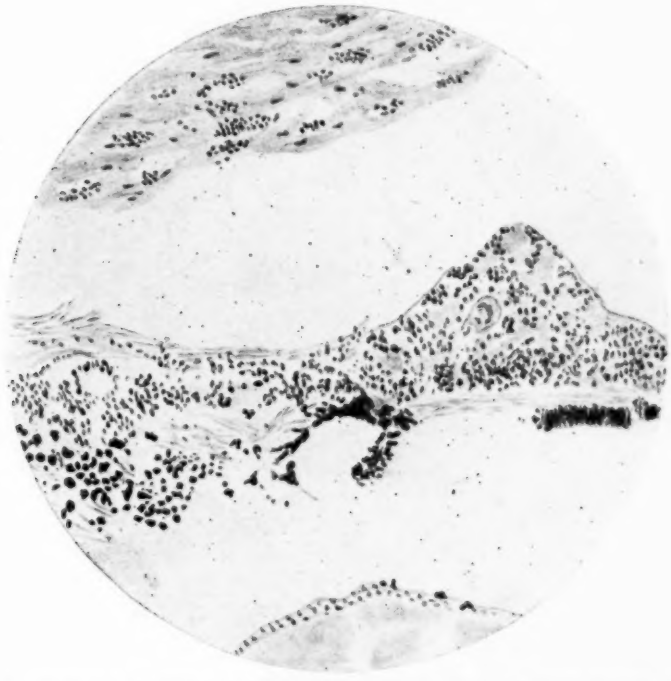

Fig. 4. Case 2. Marked infiltration of iris stroma with lymphocytes. Tubercle formation with giant cell near the pupillary margin of the iris. Pigment layer torn away posteriorly with evidence of its earlier attachment to anterior lens capsule.

Case 3.—Material supplied by Dr. W. G. M. Byers, Royal Victoria Hospital, Montreal

M. Y., female, single, aged twenty-seven years, consulted Dr. Byers for pain and inflammation in the left eye. She gave a history of the eye having been struck by a splinter of wood a month previously, but it gave her no trouble for three weeks' time. It then became red and she could not stand the light. The patient was a very poorly nourished woman, and altho a physical examination was made, no evidence of a general tuberculous lesion could be found. There was no history of tuberculosis in her family.

There was a small central opacity of the cornea, with considerable hyperemia of the iris. There were numerous

deposits on the inner surface of the cornea, apparently mostly central and to the temporal side. The pupil could be kept fairly well dilated. The cornea tended to assume a steamy or edematous appearance, and there was distinct tenderness over the ciliary body. There was no manifestation of tubercles of the iris, but subsequent examination was finally inhibited by a generalized interstitial keratitis.

Approximately one month after admission to the hospital the patient showed marked signs of improvement, although the cornea did not clear up. The evening temperature was 99°, morning 97.3°. She was finally discharged, as she had an opportunity for convalescence in the country.

She was readmitted to the Royal Victoria Hospital two months later with the eye in an acutely inflamed and painful condition. The cornea was completely opaque and somewhat staphylomatous. Central ulceration had taken place, and a definite hernia of Descemet's membrane was evident, measuring less than 2 mm. across. She said that this had burst on more than one occasion. Details of the interior of the eye could not be obtained. The eye was naturally soft, and vision was reduced to perception of light only. There were no changes in her physical condition, and the temperature remained as at last entry. A smear of the conjunctival secretion showed a few Grampositive cells, later staphylococcus albus. The eye was enucleated by Dr. Byers. A von Pirquet reaction subsequent to enucleation was positive.

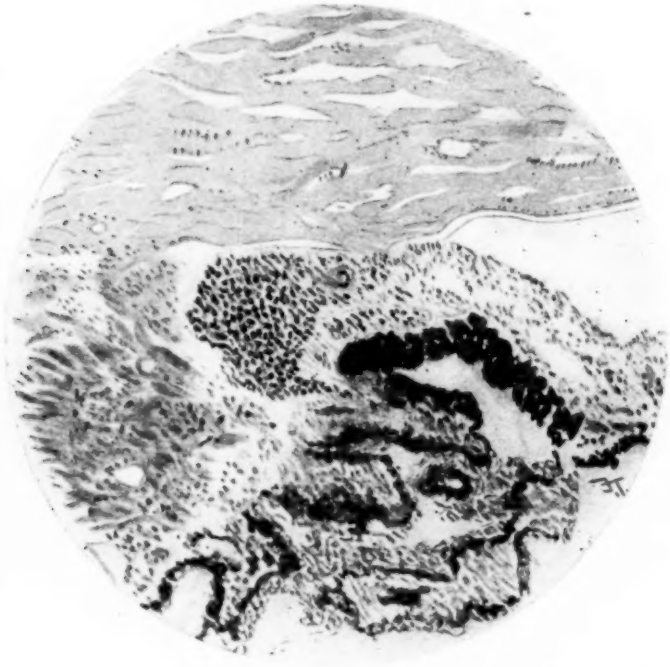

Fig. 5. Case 3. Marked infiltration of iris stroma with definite tubercle formation at root of iris, showing giant cell. Moderate degree of injection of ciliary body with infiltration of leukocytes about the ciliary processes.

On account of the necrotic condition of the cornea, this is the most complicated but by no means the most interesting of the sections. There is a marked condition of superficial as well as of deep injection of the pericorneal vessels. The deep vessels especially show a marked condition of dilatation. with clumps of leukocytes aggregated about the vessel walls.

The superficial layers of the corneal

epithelium are multiplied, and the deeper layers are edematous. The epithelium is distinctly irregular, dipping down into the diseased substantia propria as definite bud or nipple-like projections. Bowman's membrane is intact, but wavy and irregular in its course. Doubtless it is broken in other sections. Directly beneath this the cornea is distinctly vascular—naturally more so at the corneoscleral margin.

The substantia propria is markedly necrotic, the intercellular spaces being crowded with lymphocytes and with some pus cells. There are tiny blood-vessels in the cornea, the more superficial areas showing a condition of perivasculitis. A definite tuberculous nodule is well seen about the center of the substantia propria, fairly close to the filtration angle, and about midway between Bowman's and Descemet's membrane. It stains somewhat pale at the center, but there is no evidence of necrosis or of giant cell formation. The center of the cornea is distinctly necrotic, being occupied entirely by granulation tissue. The granulation consists of a stroma of amorphous cells in which are included fibroblasts, lymphocytes, and the various elements of a chronically inflamed iris, pigment cells, and a mass of endothelial cells. Descemet's membrane is naturally broken and curled up at the point where the earlier ulcer formed. Where it is intact, numerous aggregations of lymphocytes line its endothelial surface. Numbers of leukocytes and fibrin lie free in the remains of the anterior chamber.

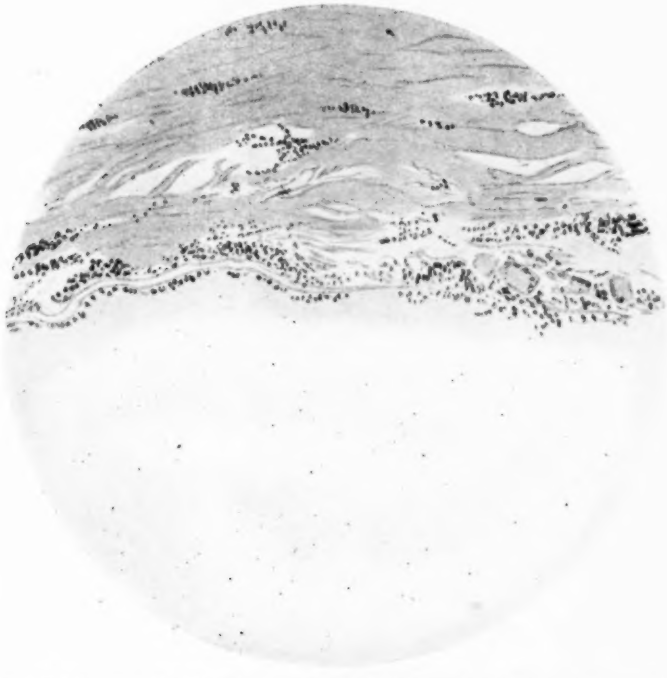

Fig. 6. Case 4. Taken near the filtration angle. Gradual necrosis of Descemet's membrane with groups of leukocytes adherent to its endothelial surface. Above it and between the deeper cells of the substantia propria is a marked infiltration of leukocytes with giant cell formation.

A definite tuberculous nodule with a central giant cell is apparent in the filtration angle, while another is even more evident in the ciliary body of the same side, close to the root of the iris (Fig. 5). The iris is injected and shows small tubercles in the process of formation in its stroma nearer the filtration angle. So much of the iris is

necrotic and amorphous, included in the ulcerated process of the cornea, one may reasonably suppose that the presenting portion may have formerly been more extensively diseased. There are, however, no giant cells in the portion of the iris included in the diseased cornea.

The ciliary body is moderately injected, the lining cells of the ciliary processes showing a manifest exhibition of leukocytes attached to their

oped suddenly seven years previously, when she was out of doors, at which time she experienced a sensation as of a grain of sand having blown into her eye. The eye recovered, but broke out with similar attacks on a number of occasions. It became perceptibly worse six months ago, when variations in temperature and bright lights would cause her a great deal of pain and photophobia. She was referred to the Royal Victoria Hospital.

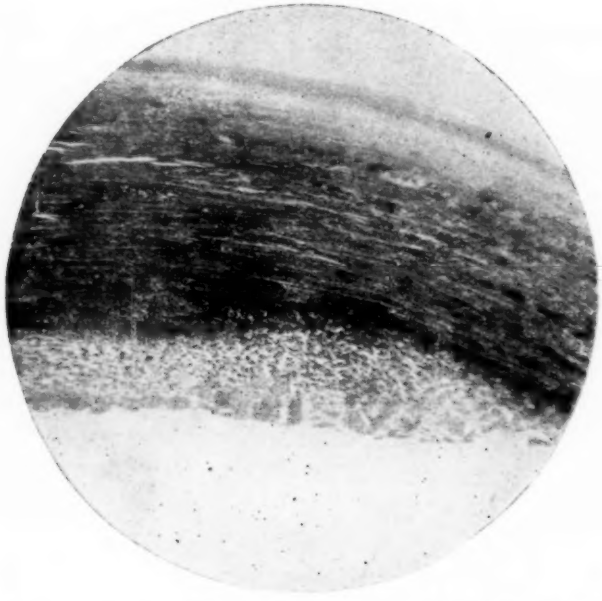

Fig. 7. Case. 4. Intense infiltration of substantia propria, especially the deeper layers. Lowest layer of cells actually necrotic, stain poorly, and innumerable giant cells are manifest (low power).

side, while other cells lie free in the neighboring vitreous, at least one forming a distinct clump—the nucleus of a later tubercle. Some of the retinal vessels are distinctly dilated, with perivascular exudate about their walls and with numerous leukocytes, chiefly lymphocytes and polymorphs, within the lumen of the dilated capillaries. A perivascular tubercle is well shown in at least one section. There is only a very moderate degree of infiltration in the stroma of the choroid.

Case 4.—M. M. C., female, single, aged forty-six years, consulted me complaining of pain and loss of vision in the left eye. The condition devel-

The patient was an unusually large but neurotic woman. Her previous health and family history were good. There was no evidence of focal tuberculosis elsewhere in the body after a very careful physical examination. The eye was moderately injected, with intense intolerance to light. The iris was discolored and would not dilate to any appreciable extent. There appeared to be no deposit peripherally on the endothelial surface of the cornea. The central portion of the cornea, or that considered as the area covering a moderately dilated pupil, was occupied by a dense, regular, deep seated grayish mass. The condition was dia-

gnosed as a tuberculoma of the cornea, and a diagnostic dose of 2 mg. of T. O. was given. The temperature rose from subnormal to 99.2°, and an acute reaction occurred in the eye. Therapeutic doses of tuberculin emulsion were then proceeded with, starting at 1/20,000 mg., but no improvement ensued. As the eye was practically sightless, and the pain was intensely acute, I enucleated the eye at the patient's request.

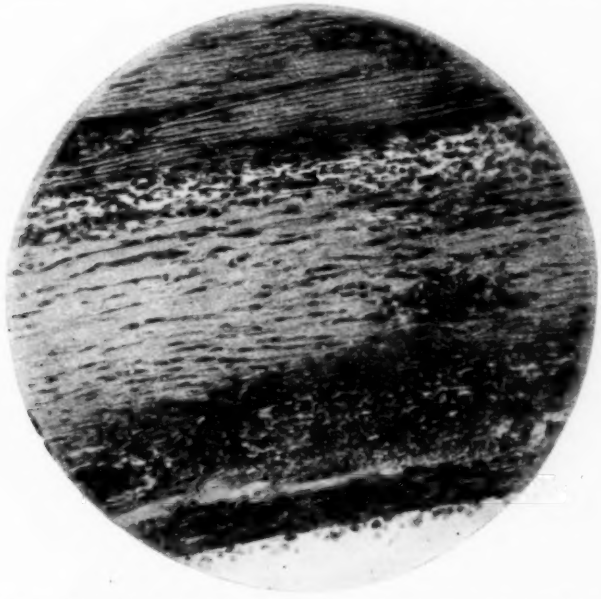

Fig. 8. Case 4. Shows character of infiltrtion of cornea. Deeper layers are actually necrotic, with area of infiltration assuming the form of a tubercle above. Necrosis of Descemet's membrane with marked proliferation of endothelial cells (high power).

There is marked superficial and deep injection about the limbus corneae, the deeper vessels showing a decided infiltration about the vessel walls. The more superficial veins are widely dilated and are filled with red cells. There is no edema of the corneal epithelium. Bowman's membrane is intact and, comparatively speaking, the superficial lamellae of the substantia propria are clear. As one proceeds more deeply there is an intense infiltration of the substantia propria (Fig. 7). This is so evident at the center of the section in the neighborhood of Descemet's membrane that actual necrosis is seen to have occurred (Fig. 8). The infiltration thruout the cornea consists practically entirely of lymphocytes. In the deep layers these have broken down and stain very faintly, constituting what has to be regarded amorphous cellular tissue. Scattered thruout this area are innumerable large giant cells.

Beneath this, at the center of the section, Descemet's membrane is also necrotic and cannot be recognized as such. It is clear, but lined with organized lymph or possibly by proliferated endothelial cells. There are numerous leukocytes or clumps of leukocytes attached to its endothelial surface at the more peripheral parts of the section.

The iris is markedly infiltrated and several small nodules can be seen on its endothelial or anterior surface. One nodule practically occupies the filtration angle at one point, while others may be recognized at the pupillary margin. There is no necrosis or evidence of giant cell formation in the iris, but the iris pigment is markedly disintegrated. The iris is intensely injected, and at one point has fallen forward, completely occluding the filtration angle. There is considerable inflammation of the ciliary body, and the

more anterior of the choroidal vessels show a decided injection about their walls.

COMMENT.

Parsons classifies tuberculous lesions of the iris as follows: (1) Miliary tubercule; (2) confluent or conglomerate tubercle; (3) tuberculous iritis. The last type may be indistinguishable clinically from other forms of chronic iritis, but microscopically sections reveal tubercle systems or the presence of bacilli.

The four cases just recorded may be considered to fall into the last mentioned class, not only on account of the clinical appearance of the various lesions, but also because of the peculiar chronic nature of each individual case when compared with the more acute lesions of classes 1 and 2. Parsons considers class 3 to be the rarest form of the disease in the iris, and refers to cases of Costa and Prunenda, Edmunds and Brailey, Knaggs, and Kalt. There is generally diffuse infiltration and thickening of the iris. Giant cells may be present, but tubercle systems not necessarily evident. Naturally necrosis with an exhibition of pus in the anterior chamber supports the diagnosis. The demonstration of tubercle bacilli is, naturally enough, conclusive evidence, but the diagnosis is not necessarily excluded on account of the inability of demonstrating the microorganisms. Animal inoculation may be of value. Diagnostic doses of tuberculin, in my own clinical experience, are not always necessarily positive.

Comparing the tuberculous with the syphilitic nodule, the opinion has been that the last mentioned occupies the root of the iris. Our more exact methods of diagnosis, as well as some of the more recent pathologic contributions, make us somewhat more guarded in indorsing such an assertion. For, if the statement be reversed, we note in case 2 of my series that the lesion appears anteriorly near the pupillary margin, but a second nodule may also be detected directed backward, and not far from the root of the iris. In case 3 a nodule is definitely at the root of the iris, and one also in the ciliary body, with a secondary or, more correctly speaking, associated tubercle in the substantia propria. In case 4 the infiltration is so intense that actual tubercle systems cannot be detected in the iris.

It is interesting to record in this regard that within the past three months I have had two patients with iritis developing very suddenly and from no apparent cause. In each case the nodule or nodules of the iris were quite evident about the filtration angle below, and an associated keratitis was present to an alarming acute degree. A Wassermann reaction of the spinal fluid was negative, but a positve reaction, both local and general, to tuberculin, in one case to 0.5 mg., in the other to 2 mg., added confirmation to a suspected diagnosis.

In the syphilitic nodule the iris tissue itself is of normal thickness, and the nodules fade away in the surrounding tissue. They may break thru the surface of the iris and communicate with the anterior chamber. They consist of mononuculear cells embedded in a fine reticulum. As in gummata, giant cells may be found, but rarely caseation. There are widely dilated capillaries within the nodules, while tubercles, on the other hand, are avascular.

No little interest is shown in the discrepancy of opinion as to whether the tuberculous focus in the iris is primary or secondary to a preëxisting tuberculous process. Leber, Fuchs, and de Wecker claim the disease invariably to be a secondary manifestation, while Parinaud, Lawford, Bach and others are as positive of the iris itself being the initial source of infection. In case 1, altho no primary source of infection could be actually pointed out, a very suggestive family history of tuberculosis would make one more than suspicious of a latent tuberculous lesion. Case 2 showed systemic manifestations of the disease in inflamed glands of the neck. Case 3, altho the most suggestive in appearance of all four, showed no actual le-

sion after careful clinical examination, but exhibited a positive tuberculin reaction after the eye had been removed. Case 4 was an actually robust, heavy woman, but gave a very marked local reaction to 2 mg. of T. O., with a corresponding general reaction.

It is further of interest to note that each of my cases was a female, ages ranging from eighteen to forty-six years. Seven out of eight human cases reported by Stock were also females, the manifestations of the disease appearing still later in life.

One cannot approach an intelligent appreciation of tuberculous iritis without recognizing the painstaking and scientific endeavor manifested in the work of Stock, on the one hand, and of Verhoeff, on the other. The latter has seen fit to disagree with the former in his work on the experimental production of intraocular tuberculosis in animals, Verhoeff preferring to inoculate dead bacilli or the toxins of bacilli directly into the anterior chamber or into some other part of the eye. Stock, on the other hand, preferred a mild dilution of the actual bacilli, which he introduced into the ear veins of rabbits. Altho Verhoeff's technic would at first glance suggest a more benign form of infection, as possibly more comparable with that exhibited in the actual process as it exists in man, yet Stock, by introducing the bacilli at a point away from the eye, allowed for a liberal dilution, also for such inhibition which the lymphocytes and leukocytes might supply. It is further questionable if, when the microorganism reached the eye, the reaction was more violent in the one series of cases than in the other. We must also not overlook the tremendous care and completness of Stock's undertaking. I can vouch for its thoroness, having been with him when part of it was in progress. Forty-eight animals were inoculated, and a careful clinical and pathologic examination, not only local, but also general, was systematically made of each individual case. That the effect of inoculation was not invariably unusually acute is proved by the fact that some rabbits lived up to two years after inoculation. Furthermore, in cases where tuberculous iritis was induced, healing in some instances took place in from two to five weeks.

Stock, from his experimental work on rabbits, has come to the following conclusions: The first symptom manifested is a general thickening of the iris tissue, without any unusual thickening of the blood vessels. Three or four days later small grayish masses appear in the iris tissue. As I have already given it as my clinical and pathologic experience, Stock supports my contention by affirming that there is no such thing as a site of predilection for the tubercle of the iris. It may appear at the pupillary margin, at the middle of the iris, or at the filtration angle. The nodules on healing leave a white spot. Some animals showed a generalized hyperemia of the iris, with the formation of new vessels and a general appearance of granulation tissue. Infiltration may be so intense that solitary nodules cannot be detected. Later there may appear changes in the surrounding tissues, as parenchymatous keratitis, with manifest pericorneal injection of the deep ocular vessels.

Pathologically the nodules, tho possibly having a site of predilection, are more numerous on the posterior than on the anterior surface of the iris. The nodules consist at first of mononuclear leukocytes without any epithelioid cells. Some nodules may reappear over the site of a previously healed tubercle. When left for a long time and allowed to increase in size, one notes in the center of the nodule large mononuclear cells with pale staining nuclei, epitheliod cells. One can only find giant cells in those cases where the process has been active for months, and tubercle bacilli could be demonstrated only in those cases where central caseation of the individual tubercle had occurred.

In the more malignant form, where a parenchymatous keratitis ensued, the iris was generally studded with tubercles. The center of such tubercles was generally necrotic. The sections, especially those from cases 3 and 4, show

a distinct disturbance of the endothelial cells of the cornea when a keratitis punctata is instituted at the back of the cornea. In the animals inoculated, as well as in the human cases recorded by Stock, Descemet's membrane always remained intact. Case 4 in my series is rather an exception to this rule or acceptance, where a fairly distinct atrophy or actual necrosis of this membrane may be seen to have taken place. Descemet's membrane behind is densely covered with lymph, and above by a distinct infiltration of lymphocytes and numerous giant cells in part of the cornea suggesting an early necrosis. On the other hand, case 3 demonstrates the absolute obstinacy and resistance of Descemet's membrane, presenting itself forward as a knuckle or hernia or descementocele after an actually complete ulceration of the substantia propria has taken place. The resistance of this form of a hyaloid membrane is quite comparable to that already pointed out by me in the case of the membrane of Bruch in cases of tubercle of the choroid. The whole cornea may be diffusely infiltrated, and new vessels may encroach upon the corneal tissue. There is a circumscribed nodule formation in the cornea itself, as well as about its margin.

An infiltration of the cornea is the rule rather than the exception in my experience. The ciliary body is not of necessity always acutely involved in the disease process. In gross involvement of the iris one may find large or small tubercles of the ciliary body. Stock was unable to find the same pathologic manifestations in animals as one would expect to find from clinical observations in the human.

This article would be far from complete were I not to attempt to acknowledge the important scientific work done by Verhoeff. His contribution on animal inoculation, as well as his reports on human tuberculous eyes pathologically examined, is more or less restricted in comparison with Stock's work. But his general approach of the subject and his astutely scientific interpretation of the possible transmission of the disease is more than on a par with the work of earlier writers. By introducing dead bacilli into the vitreous, or, for that matter, into the anterior chamber, he has shown that in several weeks, or even months of time, there may be produced nodules in the corneosclera closely simulating those of sclerokeratitis, as is manifested clinically in man. These have been manifested in a naturally modified form in all my cases, with definite lesions in the iris and ciliary body, and also in the retina, as I have been able to demonstrate in one case. In the case of a marked involvement of the cornea little reaction may be apparent in the ciliary body, a condition attributed to the fact that live bacilli, even tho of an attenuated virulence, will find the cornea and sclera more suitable for their proliferation owing to their avascular nature. The cornea is more involved in experimental work on animals directly inoculated, while the reverse is the case in man. This is as one would suppose or expect—in the one case the inoculation is almost direct thru the medium of the anterior chamber, in the latter instance it is indirect thru the venous capillaries of the uveal tract.

Verhoeff makes the statement that in his experimental cases the size and number of the lesions were greater at the filtration angle than elsewhere, showing that more bacilli lodged there. One might offer as an explanation the fact of the prevalence of tubercles of the iris occurring close to the filtration angle as borne out by Stock, as well as by myself. Sections from the cases which I am presenting do not necessarily always substantiate this fact, altho acknowledging the almost constant association of corneal involvement with tuberculous iritis. In the cases here recorded the iris itself is more involved than any other part of the eye. Furthermore, we notice in this series, as well as in the cases which I have had an opportunity of studying clinically, that the lesion in the cornea is more often opposite the pupillary area than about the filtration angle and ligamentum pectinatum. One may explain

such a condition by the fact of the toxins ultimately reaching that part of the cornea with the most stagnant supply of lymph, as one notices in any form of interstitial keratitis. Further, the aggregation of lymphocytes, with the attendant bacilli, are drawn directly from the posterior chamber thru the pupil to the anterior chamber. From albuminous changes in the aqueous and consequent alteration in its specific gravity these lymphocytes, instead of falling down into the filtration angle, fall more directly forward. Such a condition of so-called punctate keratitis, tho not perhaps an actual source of infection, has at least an influence in inhibiting nutrition from the aqueous, which we are led to believe supplies Descemet's membrane and the posterior layers of the cornea. These layers, with Descemet's membrane, are in consequence attacked from both sides. This interpretation has been shown to be more than a probability in cases 3 and 4.

There was evidence of an active or acute inflammatory condition in the choroid in one case only—case 4. Case 3 shows what might in time have developed into a retinal tubercle—a widely dilated vein filled with numbers of leukocytes, many, strangely enough, being of the polymorphonuclear type. There is distinct evidence of the migration of blood cells thru the vessel walls and of the formation of an early tho definite perivascular tubercle. Verhoeff, in his work, very properly supposes or suggests the probability of the infection, particularly as applied to the corneosclera, as coming from the lymphocytes escaping from lesions occurring in the choroid, retina, or ciliary processes. These clumps of cells, actually nascent tubercles, find their way thru the pupillary area, later to attack the cornea and corneosclera thru the ligamentum pectinatum. The infection is consequently direct and not one of metastasis.

In a former contribution which I had the honor of presenting before this society I attempted to show how, in cases of tubercle of the choroid, the condition extended thru the bloodstream. The migration of lymphocytes thru the vessel walls and the subsequent formation of a perivascular tubercle were demonstrated not only in the vessels about the base of the brain, but also in the pial capillaries extending into the vaginal space about the optic nerve. What is true in the acute form of the disease may, I claim, be equally true in the more chronic phase, tho from its mere chronicity not so easily demonstrable. One may thus account for tubercles found free in the vitreous, about the ciliary processes, in the choroid, and even in the more anterior portion of the retina in tuberculous iridokeratitis.

My observation in cases 3 and 4, while maintaining that the infection of the cornea is due to toxin and is endogenous, may still support Verhoeff's maxims. The aggregation of lymphocytes, or, what I have formerly termed them, nascent tubercles, after reaching the aqueous may find their way to the filtration angle and thru the ligamentum pectinatum, the toxins, or possibly the actual bacilli, to be taken up by the pericorneal lymph capillaries. A condition of parenchymatous keratitis may exhibit actual tuberculous elements other than ordinary manifestations of interstitial inflammation. I do not consider that the necrosis of Descemet's membrane in case 4 has resulted from direct apposition of tubercle upon its endothelial lining, any more than I have been able to demonstrate a diseased process in the membrane of Bruch in the acute form of the disease involving the choroid. My opinion is that a deep interstitial keratitis must first be present, with subsequent necrosis and doubtless with actual bacilli present rather than toxins. Case 3 supports this opinion, as well as the large series of cases prepared by Stock, who was unable to demonstrate a single case of initial necrosis of Descemet's membrane. Compared with his exhaustive series, both comparative and human, my own exception in case 4 would appear as a unique condition.

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HEREDITARY CONGENITAL PTOSIS WITH REPORT OF 64 CASES CONFORMING TO THE MENDELIAN RULE OF DOMINANCE

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This account of hereditary ptosis reporting a large family extending to six generations is slightly abridged from a candidate's thesis presented to the American Ophthalmological Society.

Near the summit of the Great Smokies, in western North Carolina and eastern Tennessee, on the head waters of Laurel and Nolichucky rivers, have lived for more than a century the strong, sturdy, and virile descendants of one Martin Maney, an emigrant from Dublin, Ireland, a veteran of the Revolutionary War, and one of the first pioneers to cross the Blue Ridge and brave the dangers of mountain wilderness and the Indians of those times—strong and sturdy, as evidenced by their ability to cope with the vicissitudes incident to pioneer life, and prolific, as shown by their large families —18 children in one, 10 to 14 in four, and 28 resulting from the union of one man (No. 17*) to three wives—15 to the first, 2 to the second, and 11 to the third.

Until recently these simple, poor, yet honest mountain people, isolated from railroads and thoroughfares, have lived in this sparsely settled country, where the high altitude, pure water, abundant sunshine, and the many other natural resources are conducive to happiness, longevity, and prolificity. Being content with their natural environment and with their innate love for the mountains, they have not cared to migrate into more populous centers, and on account of their segregation it has been possible to construct an accurate family tree, and to study the condition of hereditary congenital ptosis in many of the 64 cases recorded.

Case 1.—W. H. (No. 26), aged fifty-one years, farmer, in good health, has double ptosis, but no other evidence of physical or mental degeneration. Forehead greatly wrinkled, especially on right side. Eyebrows standing high. Width of nose, as between nosepiece of eye-glasses, 6 mm.; distance between inner canthi, 29½ mm.; distance between bridge of nose and inner canthus, 11¾ mm.; width of palpebral fissure, 24 mm.; diameter of cornea, 7½ mm.; distance from cornea to inner canthus, 8 mm.; pupillary distance, 55 mm. Upper lid shows no wrinkles, and covers the upper part of the pupil, necessitating constant action of the occipitofrontalis, and tilting of the head backward, in order to fix objects above the horizon. Patient able to superduct eyes, but this to only a limited degree. No other extraocular muscle impairment or imbalance; no pupillary reflex

*Only 18 of the 28 offspring appear on the family tree because of lack of data concerning remainder.

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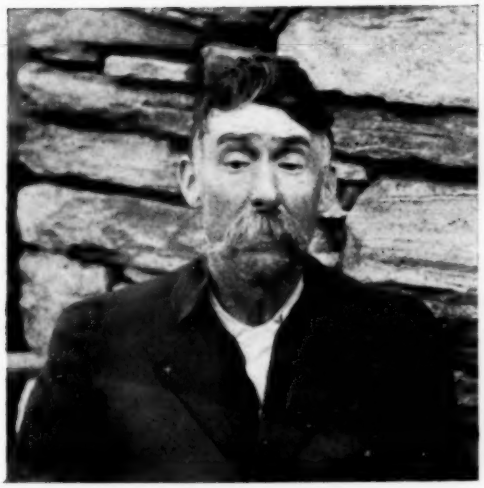

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CASES OF CONGENITAL PTOSIS (BRIGGS)

disturbance nor impairment of the ciliary muscles save that due to presbyopia. When thumbs were pressed firmly against the eyebrows, so as to prevent the associated action of the occipitofrontalis, patient was unable to raise the lids showing total impairment of each levator. Refraction: V. R. E.=0.8, with sph.+0.50⊃cyl.+0.75 axis 15°=1; L. E.=0.8, with cyl.+0.75 axis 165°=1. Presbyopia, 1.50 D.

Patient states that he has never had any trouble with eyes except that due to the ptosis, which is borne out by the fact that he still uses an old cap and ball rifle for squirrel hunting. The patient's son (No. 68), grandson (No. 124), mother (No. 11), grandmother (No. 3), and great-grandmother (No. 1) were similarly affected.

CASE 2.—G. H. (No. 68), aged twenty-five years, son of W. H., resembles in general stature his father, and has about the same amount of ptosis, but is the more able to correct the deformity by the associated action of the occipitofrontalis. Position of head slightly back. Patient able to superduct eyes, but this to only a limited degree. No other extraocular muscle impairment or imbalance; no pupillary reflex disturbance nor impairment of the ciliary muscles. Deep furrows in forehead, due to muscular attempt to raise lids. Width of nose opposite inner canthi, 11 mm.; distance between inner canthi, 35½ mm.; diameter of cornea, 7½ mm.; pupillary distance, 61 mm. Can lift upper lids slightly above pupil, but, as in case of the father, has no lifting power of upper lids when the action of the occipitofrontalis is checked by pressure over the eyebrows. Can turn eyes upward when lids are lifted, but this action is slightly impaired. Vision each eye, 1. No marks of degeneration.

CASE 3.—C. H. (No. 124), son of G. H., four years old, slightly undeveloped. Has marked ptosis. Upper lids hang below upper margin of pupil, necessitating extreme backward position of head in attempting to fix objects in horizontal field. Small wrinkles in forehead, indicating auxiliary action of the occipitofrontalis. No other extraocular muscle impairment or imbalance; no pupillary reflex disturbance nor impairment of the ciliary muscles. On lifting eyelids with fingers, patient is unable to lift eyes above the horizontal meridian, indicating impairment of the superior recti, but since his father, aunt, and grandfather possess this power of superduction, it is probable that this function will be acquired in later years. Base of nose very broad, measuring 20 mm., compared to 6 mm. of the grandfather and 11 mm. of the father. Distance between inner canthus and side of the nose, 9 mm.; width of palpebral fissure, 20 mm.; height of palpebral fissure, 6 mm.; pupillary distance, 52 mm. Unable to determine vision, but no evidence of defect.

CASE 4.—Mrs. McK. (No. 70), aged twenty-three years, daughter of W. H. (No. 26), has the least amount of ptosis observed in any of the genealogy. Has very narrow nose, like her father; eyebrows highly raised; the skin over the forehead corrugated on account of the contraction of the occipitofrontalis in an effort to assist the levator. Ptosis more marked in the left. On exerting pressure over the supraorbital region, preventing action of the frontal portion of the occipitofrontalis, patient still able to slightly raise the upper lid, showing that the action of the levator in this case is only partially paralyzed. The lacus lacrymalis is very broad vertically, extending downward, inward, and forward. Distance from inner canthus to the side of nose, 8½ mm.; distance between inner canthi, 36 mm.; width of palpebral fissure, 23 mm.; vertical width of palpebral fissure, 6½ mm.; pupils, in moderate light, 3½ mm.; crest width of nose, 14 mm.; pupillary distance, 64 mm. On looking straight forward, upper lid covers upper part of pupil. On attempting further upward motion the occipitofrontalis is called more and more into action. Vision above 20 degrees impossible without bending head backward.

CASE 5.—Male infant (No. 81), six weeks old, in splendid health, has very marked ptosis. There is no evidence

of action of the occipitofrontalis as an auxiliary aid to the levator, and, as the levator has no action, the lids scarcely separate, there being perhaps about 1 mm. opening. Palpebral fissure very narrow to the extent that blepharophimosis exists. Lifting upper lids causes immediate photophobia, but reveals eyes normal in appearance. Unable to test extrinsic muscles, but no evidence of their impairment.

CASE 6.—(No. 111.) Girl, aged fifteen years, in good health, moderate amount of ptosis; total impairment of function of levators. Has congenital contraction of the subcutaneous tissues over the malar, or attached to same, drawing the lids to the outer canthus, especially the lower, far away from the eye. This contraction of the lower lid stretches the lower canaliculus, misplacing the lower punctum 7 mm. from the inner canthus, and gives a general appearance to the eyes of convergent strabismus, but this is only apparent, as there is no muscular imbalance. There is a chronic granular condition of the lids, due to their exposure, and the cornea in the lower outer quadrant, for the same reason, is roughened, rendering the vision 0.5 in the right eye, that in the left being normal.

The six cases above reported represent the fourth, fifth and sixth generations. Cases Nos. 81 and 124, infants in the sixth generation, have seemingly an equal if not a greater amount of ptosis than had case No. 26 or case No. 58 in the fourth generation, or of any shown in any of the photographs, which would indicate that the degree of ptosis remains constant, and is at least not becoming diluted.

SUMMARY.—The cases of hereditary ptosis herein recorded are members of a genealogy extending thru six generations over a period of one and one-quarter centuries. Inheritance in every case is direct, no generation in the lineage of the affected being skipped except in the one instance, Case No. 125, in the sixth generation, whose mother, No. 90, a member of the genealogy, is said to be normal, and to have married one who was also normal.*

Twenty-three families are represented, in 17 of which the father, and in 6 the mother, transmitted the malformation. In no case did affected parents fail to transmit ptosis to one or more of their offspring.

There was only one case of intermarriage,† and that between affected female No. 43, in generation four, to a normal male, second cousin, No. 109, in generation five. Of the two male offspring, one was affected and the other normal.

Of the 128 members of the genealogy composing the 23 affected families, 64 were affected with ptosis and 64 were normal; 74 were males, 53 females, and one of unknown sex. An equal num-

*Information gained from relatives.
†Mountain people seldom intermarry.

Generation	Number Members			Affected			Normal			Affected Parents		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
I	..	1	1	..	1	1	..	..	..	..	1	1
II	1	2	3	1	2	3	..	..	..	1	2	3
III	13	8	21	6	4	10	7	4	11	5	1	6
IV	27	15	42	16	7	23	11	8	19	9	1	10
V	31	25	56	9	16	25	22	9	31	2	1	3
VI	‡4	2	7	‡2	..	3	2	2	4	..	..	..
Total	‡76	53	130	‡34	30	65	42	23	65	17	6	23
Enumerated twice	2	..	2	1	..	1	1	..	1	..	..	..
	74	..	128	33	..	64	41	..	64	..	..	..

‡ One sex unknown.

ber (64 of each), were affected and normal. Of the affected, 33 were males, 30 were females, and 1 of unknown sex, while of the normal, 41 were males and 23 females.

Of the twenty* affected parents, 16 were males and 4 females. Of the 121 offspring (71 males and 50 females), 61 were affected and 60 normal. The 16 fathers had 100 children (62 males and 38 females), to 47 of whom they transmitted ptosis, there being 53 normal. The four mothers bore 21 children (9 males and 12 females), of whom 14 had ptosis and 7 were normal. Of the offspring, 61 had ptosis and 60 were normal, the fathers' share was 47 ptosis to 53 normal, while the mothers' was 14 ptosis to 7 normal. Of the 71 male offspring, 62 were from affected fathers and 9 from affected mothers, while of the 50 female offspring 38 were from affected fathers and 12 from affected mothers.

	Parents	Male	Female	Ptosis	Normal	Total
Fathers ...	16	62	38	47	53	100
Mothers ...	4	9	12	14	7	21
	20	71	50	61	60	121

Literature.—Ptosis unaccompanied by motility defects of the eye is seldom seen. Epicanthus and impairment of function of the superior rectus most frequently exist, yet paralysis of each and all of the extrinsic muscles has been noted. In no case found in the literature has paralysis of the intrinsic muscles of the eye been a complication of ptosis, except in complete ophthalmoplegia. Disturbance of the pupil and accommodation are, therefore, practically never seen associated with ptosis.

Hirschberg[17] found a case of ptosis accompanying total ophthalmoplegia in a child whose mother and grandmother were similarly affected. Schiller[35] reports father and two sons having ptosis with paralysis of all the outer eye muscles. Horner[19] reports inherited ptosis through three generations of one family, and in nine brothers of another family, associated with impairment of the superior rectus. Rampoldi[33] reports ptosis in father, son, and daughter, with immobility of the extrinsic muscles and slight astigmatism. Daguillon[9] reports congenital hereditary ptosis with divergent strabismus, congenital hereditary myopia, and amblyopia. Lawford[25] reports ptosis in father and three sons among seven children, immobility of the eyes in the vertical meridian, with only slight amount of mobility to the side. Horner[19] reports cases of ptosis in several generations of the same family. Heuck[16] reports ptosis in mother, two sons, and one daughter, in which the eyes were directed downward and easily converged. There was complete loss of function in the superior and inferior recti, while the other extrinsic muscles functioned. There was also deficient vision. Hirschberg[17] reports ptosis in a mother, daughter, grandson, and great-grandson, with impairment of superduction, abduction, and adduction. In the grandson, epicanthus, superduction impossible, and divergence alternating with convulsive convergence. Vignes[43] gives cases of ptosis and epicanthus in grandfather, five sons, and one daughter of 11 children. He also reports ptosis in a father, two sons, and one daughter of 5 children. Vossius[44] gives history of two brothers with impossible movement of the eyes in the vertical meridian and dimness of vision. Ginestous[12] reports child of twenty-five months showing incomplete ptosis, epicanthus, and paralysis of the superior rectus. Ahlström[1] reports case of ptosis and ophthalmoplegia externa in a fifteen-year-old boy, and history of several relatives similarly affected. Guende[15] reports three brothers in family of nine children with ptosis complicating ophthalmoplegia externa. Dujardin[11] reports maternal grandfather, mother, and four daughters having ptosis with immobility of the eyes upward and downward and limitation of lateral movements. Schiler[35] reports ptosis in grandfather, father and son, with immobility of the outer muscles, high hypermetropia, and a dot-like darkening of the lens. Gour-

*Leaving off the progenitor, father of No. 1, parents who intermarried, and No. 90 (mother of S), from total number of parents.

fein[14] reports ptosis in grandfather, father, and four sons, the female members of the second and third generations remaining healthy. Movements of the eyes always accompanied by rotary nystagmus. They also showed amblyopia, changes in the optic nerve and the retina, flattening in the region of the eyebrow. Ayres[4] reports grandfather and uncle with immobility of all eye muscles. Paul Bloch[7] reports two brothers having paralysis of the abducens and ptosis.

Steinheim[39] reports ptosis and epicanthus in five generations. The great grandfather had ptosis. Of his five children, two males and one female were affected. One male and one female married and moved to America, no more being known of their descendants. The other male married, had two daughters, one normal and one affected; the latter becoming the mother of five children, of whom two males and one female were affected. Of the girl's children two were normal and one affected. Of the two males, one became the father of two normal and two abnormal children, while the other was father of three abnormal and three normal offspring.

Hüttemann,[21] in 1911, reported 11 cases of congenital hereditary ptosis and epicanthus in three generations of the same family. He notes that in all these there was a peculiar lid movement associated with lateral movement of the eyes. In a glance to left the right eye, and on looking to the right the left eye, was almost closed.

Dujardin[11] reports five cases of congenital ptosis in grandfather, mother, and three daughters, the fourth daughter being normal. One of the affected daughters had partial ophthalmoplegia.

H. P. Stuckey[40] reports father, son, and three grandsons living in northern Georgia having ptosis, one daughter being normal. These are Nos. 25, 64, 65, 66, and 67 of the genealogy of the author's cases. He considered it a probable example of Mendelian recessive. The inheritance is, however, dominant in character, as is amply illustrated in the extensive family tree.

F. R. Spencer[37] reports a case in a man of twenty-seven who gives history of ptosis since fifteen or sixteen years of age. He thinks it has gradually increased since that time, but has been much worse for the past three years. His mother, maternal grandmother, two maternal aunts, and one brother were similarly affected. His younger brother's lids began to droop at the age of twenty-two years. His mother had great difficulty in raising her lids. His abduction, adduction, superduction, and subduction were very limited, and he was unable to raise either eyelid without the assistance of the frontalis muscle.

Pathology. — Operations, autopsies, and microscopic examinations have revealed the following condition as causes of ptosis:

(*a*) Defective development of levator and other muscles of the eye. Heuck[16] found a partly developed levator measuring only 2 mm. in breadth. Bach,[5] in a case of bilateral congenital ptosis and limitation of the eye movements upward, found defective development of levator and moderate atrophy of superior rectus; the nuclear region of the oculomotor was normal.

(*b*) Adhesion of Muscles.—Albers and Wrisberg[2] found in a case of ptosis adhesion of the rectus superior with the levator; the external rectus was adherent to the inferior rectus, and the internal rectus to the superior oblique.

(*c*) Abnormal insertion of muscles was found by Rossi,[34] Heuck,[16] Dieffenbach,[10] Pflüger.[32] In some of the cases the superior rectus was found inserted back of the equator.

(*d*) Connective-tissue bands instead of muscles were found by Ahlström[1] in cases of congenital ptosis. When he laid bare the tarsal border in the left eye, no trace of the levator tendon was seen, and in the right eye only a few scattered tendon fibers were found.

(*e*) Absence of Muscle.—Lawford,[25] in a case of ptosis with divergence, found the rectus internus absent. Ahlström[1] found no trace of the levator, and Heuck[16] reports finding the same condition. Horles[18] reports a case of ptosis in which both obliques were lacking, the recti being normal. Seiler[36] found a case

of ptosis in which the inferior oblique and superior rectus of the right eye and the inferior oblique of the left eye were lacking. In another case the superior and inferior obliques of the right and the superior and inferior obliques and superior rectus of left were not found.

Steinheim,[38] in a case of congenital ptosis with defective motion of the eye, failed to find the superior rectus.

Etiology.—The etiology of ptosis leads back to the question of the cause of variation, and has been defined as the event which brings about the addition or omission of a factor. It is due either to absence of the factor for the normal development of the levator, or to the presence of an inhibitor to normal development.

Intermarriage, certainly in the last six generations, has not been a factor in the heredity of ptosis in this genealogy. Of the 128 offspring whose histories have been studied, there has been but one intermarriage, that between the affected female (No. 43) in the fourth generation and her second cousin, normal (No. 109) in the fifth generation. From this union resulted one normal male, three years old, and one male six weeks old.

There is one other instance of intermarriage between female (No. 36) and son of No. 21, who was grandson of No. 4, abnormal, two generations removed, and consequently not included in the numbered offspring. This union resulted in all normal.

It is very difficult to determine the exact anatomic cause of the anomaly. Because of their anatomic situation, it is impossible to test the muscles of the eye electrically. Koster[23] reasoned that, if the enlargement of the palpebral fissure is considered, the levator muscle of the lid exists but is paralyzed or atrophied. Since the tarsal muscle of Müller is inserted in the lower part of the tendon of the levator, if the latter is lacking, the tarsal muscle has no point of insertion and cannot raise the lid under the influence of cocain. Cocain, therefore, reveals the absence or presence of the levator. The use of this method in the author's cases examined, resulted, so far as revealing a cause, negatively.

The author thus far has not had an opportunity of operating on any case of ptosis in this genealogy, or to note the exact pathologic cause of ptosis at necropsy. He hopes, however, to operate on case No. 111, and to soon make a supplemental report of the findings.

Diagnosis.—Ptosis is either congenital or acquired, and these again may be subdivided according to the causes which produce it. It may also be unilateral or bilateral. Although some hereditary eye diseases, such as certain forms of cataract (Nettleship[31]) which occur in middle life, are not congenital, all cases of hereditary ptosis are congenital. In other words, hereditary ptosis is prenatal, manifesting itself at birth and continuously. In hereditary congenital ptosis, which is usually bilateral, there may be absence or deficiency of the levator often associated with absence or deficiency of one or more of the extrinsic muscles of the eye, most frequently the superior rectus, and most frequently of all it is associated with congenital epicanthus. There may be absence or deficiency of that portion of the third nerve supplying the levator. It is sometimes associated with sympathetic movements of the lower jaw, increasing in degree when the eye is abducted, and disappearing when it is adducted, the lid in these cases constantly retracting involuntarily when the jaw is moved to the opposite side of the ptosis (Bradburn[8]).

On the contrary, in an acquired ptosis there is usually to be found an affection of the lids, such as hypertrophy, edema, new-growth, blepharochalasis, and ptosis adiposa. It may result from trauma to the levator, or atrophy, as occurs in women of middle life, or as an early symptom of chronic progressive opthalmoplegia and myasthenia gravis. It may result from a central or cerebral degeneration. When due to a cortical lesion, it would probably be unilateral, and the only eye lesion, the other branches of the oculomotor nerve being unaffected. A nuclear lesion of the pons might produce such a lesion (Bradburn[8]). Ptosis, as a symptom, may result from constitutional diseases, such as myasthenia gravis, locomotor ataxia, toxic processes, chronic progressive ophthalmoplegia, hysteria. Acquired ptosis may also occur from

nuclear, fascicular, or basal lesions, from sphenoidal abscess and orbital lesions, and from affections of the sympathetic nerve.

The author's cases of ptosis are unique in that in no case is the ptosis complicated by any other motility defect except in the infant (No. 124), whose superior rectus did not function, and this probably not because of any defect in the muscle itself or impairment of its nerve supply *per se*, but on account of the drooping of the lid the superior rectus had never been called upon to turn the eye upward. When the child was asked to look at an object held above his horizon, he invariably tilted the head backward until the visual plane met the object, and this he did even when the lids were lifted by the observer. Observation of the eyes during sleep or under general anesthesia might have determined whether or not superduction was possible, but such opportunity was not offered.

In case No. 59 it was demonstrated that the levator had a certain amount of function, but in no other case examined could function of the levator be demonstrated.

Mendel's Theory.—The Mendelian phenomena are well illustrated in peas, mice, rabbits, poultry, and snails. Certain defects: hornless cattle—polled angus, earless sheep of China, tailless cats of Japan, short-tailed dogs and pigs are also examples of Mendelian phenomena. That we do not find more examples of Mendelian inheritance in man is due to the fact that the inbreeding necessary to bring out Mendelian segregation is not sufficiently close in man.

The eye and its appendages are subject to more hereditary diseases and malformations than in any other organ, due partly to the great number of histologic and anatomic structures concerned in its makeup, and partly to its many complicated and coördinated physiologic functions, which are so easily disturbed. Of ophthalmic disease most frequently transmitted may be mentioned: ptosis, epicanthus (Manz[27]), distichiasis, nodular and reticular opacities, corneal staphyloma, aniridia, coloboma of the iris, corectopia, cataract (Nettleship[31]), ectopia lentis, glaucoma, retinitis pigmentosa (Leber[26]), and other retinal degenerations, night blindness, nystagmus, color blindness, albinism, motility defects and errors of refraction. Of these, those showing the most marked evidence of transmission are cataract, night blindness, and motility defects, including ptosis. Most of the transmitted defects of the eye follow Mendelian rules, and, with the exception of those which are sex-linked, as color blindness and stationary night blindness, are *dominant* to the normal.

In order to discuss more intelligently the inheritance in the cases of ptosis herein reported, let us recall briefly the salient points of the Mendelian theory.

Gregor Mendel,[28] in 1865, experimenting with the edible pea (pisum sativum), took a pair of characters, tallness and shortness, and crossing the tall variety of six feet with the dwarf of one foot, it was found that the first cross-bred variety, F 1, were all tall. From the fact that the character tallness appeared in all the cross-bred, to the exclusion of the opposite character, dwarfness, Mendel called it a *dominant* character, and dwarfness, a *recessive* character. The tall, cross-bred by self-fertilization, bore seeds which produced a mixed generation, F 2, many being tall and some being short, like the tall and short grandparents, respectively, and in the ratio of about 75 per cent. tall and 25 per cent. short. The F 2 plants were again allowed to self-fertilize themselves, and it was found that the dwarfs (recessives) produced dwarfs entirely, and that further propagation of these produced pure recessives. But the tall, F 2, dominants, produced (instead of all dominants as the dwarfs produce recessives) two kinds: (*a*) plants of mixed F 3, consisting of tall and dwarfs in the proportion of three to one respectively, and (*b*) plants which gave tall only, and are those pure to tallness; the ratio of the impure (*a*) plants to the pure (*b*) being two to one. The F 2 generation dominants was composed, therefore, of three kinds of plants:

3 { *Dominants*, pure, 25 per cent.
3 { *Dominants*, impure, 50 per cent.
1 { *Recessives*, pure, 25 per cent.

Mendel found similar inheritance as above noted when all the other distinct characters in peas were used, the dominant character being shown in italics as follows: *Tallness*—shortness. *Flowers along axis* of plant or on top of plant. *Green color of unripe body*—yellow color of pods. *Shape of body inflated*—constricted between seeds. *Red seeds*—gray or brown. *Yellow cotyledons*—green. *Round seeds*—wrinkled.

Segregation and allelomorphism. Tallness (D) and dwarfness (R) (Bateson[6]) entered in the fertilized ovum in the original cross, but since the next generation showed some tall and others dwarfs, there must have been a separation (segregation) of the two characters in the process of the germ formation in the fertilized ovum (zygole) of the two characters, the segregated characters being called allelomorphic. This was shown in crossing F 1 with pure dominants and pure recessives. D R multiplied by D D gave all dominants in appearance, although composed of D R and D D plants equal in number on the average. On the other hand, D R multiplied by R R gives an equal number of dominants and recessives; the dominants being D R and the recessives being all pure recessives. This ratio of one to one, which results from D R multiplied by R R, will be referred to later in relation to the inheritance of ptosis.

If the character ptosis is dominant, the normal being recessive, there should be, in the aggregate, approximately the same number of affected and normal offspring. There were found 64 cases of ptosis and 64 normals, which conforms with mathematical precision to the rule of dominance.

In this connection it is interesting to compare the ratio of affected and normal in cases of hereditary cataracts taken arbitrarily from Nettleship's reports, as follows:

Recorder	Affected	Unaffected
Berry	20	20
Fukala	19	22
Nettleship	29	25+
Zirm	14	15
Nettleship and Ogilvie	17	25
Total	99	107

Dominants.—The following points, quoted from Bateson,[6] differentiate between dominants and recessives. "Dominant characters will, in general, be recognized as such from the fact that they are transmitted through affected persons only. The dominants will, as a rule, have one parent affected with the peculiarity and one part free from it. It is then to be expected that the children of such dominants, resulting from their marriages with unaffected persons, will show equal numbers of affected and normal. Recessive characters will be recognized by the fact that they may appear in the children of parents not exhibiting such characters, and especially among children born of consanguineous marriages. Complete proof of the recessive nature of a characteristic will be obtained only by evidence that all the children of affected parents exhibit the characteristic."

From this we reason that the author's cases conform to the Mendelian law of dominance, because—

(*a*) The transmission is thru affected persons only; there being no case where the inheritance was through an unaffected parent, except in case No. 125, a child whose mother is said to be the only normal of seven children. As this information was obtained from relatives, it is entirely possible that a slight degree of ptosis in her case might be considered normal compared to the marked degree which the other six are reported to have.

(*b*) In every case the dominants (ptosis) have one parent affected and the other parent normal. There is only one case of consanguineous marriage among the cases reported; that being between an unaffected male in the fifth generation (No. 109), wedded to an affected female (No. 43) in the fourth generation; the relationship being that of second cousins, and resulting in one affected and one normal offspring, according to the rule of dominance.

(*c*) The ratio of 64 dominants (ptosis) to 64 recessives (normals) conforms to the third qualification of dominants which requires an expectancy of an approximately equal number of normal and affected children descending from dominants (ptosis).

(*d*) That it is not a recessive charac-

ter is shown by the fact that in no case was an affected child born from normal parents, one or the other parent invariably showing the character, except in the one case, No. 125, and as this information was gained from relatives, there is a possibility of it not being correct.

(*e*) Thus far there has been no opportunity to determine what would be the result in the offspring where both parents are affected.

Sex-linkage.—Certain ocular diseases of the dominant type follow a sex-limited descent, notably color blindness and night blindness. The distinguished differences in the sex-limited, from the pure dominant types of inheritance, are that in the former—

(*a*) The males are affected more frequently than the females.

(*b*) It may be transmitted by affected males, but never by the unaffected males.

(*c*) It is transmitted by unaffected females.

(*d*) Apparently normal women, daughters and sisters of affected males, transmit the condition to their sons.

In no case in the genealogy save two was an affected child born to a normal parent. These are case No. 1, the first member of the genealogy, an affected female resulting from the union of Martin Maney, an Irish descendant, wedded to Kissia Van, a quarter Indian, both of whom had normal eyes. These cases were not examined, as they lived in the latter part of the eighteenth century, but this information comes from so many reliable sources, and especially from the oldest inhabitants in the neighborhood, that its correctness can scarcely be doubted.

Quoting from a letter from Dr. I. L. English, who was reared in that country, and has been the only physician practising there: "Martin Maney, who came when a boy from Dublin, Ireland, married an Indian. John Metcalf (No. 24) thinks that Martin Maney was little-eyed, but I learn from other old people that he was not; that when his first child (female No. 1) was born, little-eyed, the friends made alarm about the child's deformity, and its father (Martin Maney) told them to not worry, that most all his people in Ireland were little-eyed." This is the first instance of an affected child born of normal parents.

The second case is that of No. 125, sex unknown, said to be affected, born of normal female (No. 90). This family lives in middle Tennessee, and I was unable to verify the statement. It is quite possible that in a family where five of the six children have ptosis, the sixth child might, by contrast, appear normal, when in reality it might have a moderate degree of ptosis. Granting that the information is correct, it would probably mean an instance of recessiveness such as perhaps happened in the case of F 1, the first member of the genealogy. Except in these two cases the inheritance is purely dominant in character.

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THE DEVELOPMENT OF A TONOMETER.

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This account of work done to place tonometry on a more accurate scientific basis includes some notice of inaccuracies that have heretofore been admitted, and observations regarding the normal intraocular pressure.

The features I set out to improve or eliminate in the Schiötz and Gradle tonometers (and that was all I intended doing), were:

1. To avoid the changing of weights.
2. The elimination of the chart to determine the pressure in mm. Hg.
3. Placing the reading scale nearer to the cornea, so the same person could more easily apply the tonometer and make his reading.
4. Prevention of capillary attraction between plunger and barrel, of fluid from the conjunctival sac.

I made three different tonometers, then tried modifications of them, and finally decided on one which I handed to the Meyrowitz Co. to use as a sample in constructing them on a quantity basis.

I was about three years working on one and another models, trying to overcome the several mechanical difficulties encountered before I was ready for the scale and the determination of the pressure according to the manometer.

It was not until I was ready to work out the scale that I ran against my first real snag. I constructed a testing apparatus using a Riva-Roche manometer, and of course in that type I had to use air as my medium of connection

in the tubing connecting the testing apparatus (manometer), and the testing eye.

In order to satisfy myself that everything was O. K. I tried to test it out with a Schiötz tonometer and to my surprise I could not get the tonometer and manometer to agree. I examined my apparatus, but could find nothing wrong, so put on another eye and my readings with that eye were no better than the first. I borrowed a Schiötz; but that gave me no light as to what was wrong. I used a third, with no better results. A Gradle was tried and that would not agree with the manometer. All these tonometers gave lower readings than the pressure as indicated by the manometer, and I could not determine what was wrong.

Thinking that Dr. Gradle must have worked out a testing apparatus I wrote him and received a reply that he had not been able to get a satisfactory testing apparatus; so used as his standard a Schiötz that he know to be correct.

As a could get no help from that direction I went to a professor of physics at Columbia University. He looked over my work and assured me that it was all according to the laws of physics, and if the tonometer and manometer did not agree, it was the tonometer that was at fault.

I then invited Drs. Holzapfel, Hallet, Helfrich, Marple and Schoenberg, at different times, and it was as much of a surprise to them as it had been to me to find that the Schiötz and manometer did not agree. All of these men used the instrument themselves.

Dr. Helfrich hit on the novel idea, which was to try his sense of touch to determine the pressure. I adjusted the pressure to 20 mm. (the mean normal according to Schiötz), and he pronounced it a soft eye. Then without his knowledge of the pressure I increased it until he judged it to be normal according to finger palpation, and at that time the manometer registered 40 mm. (These were enucleated eyes and his fingers were applied directly to the eyeball instead of thru the eyelids as is the custom for finger measurement of intraocular pressure.)

I repeated this stunt with Dr. Marple. He pronounced 20 mm. as a very soft eye and stopped me at 42 mm. as normal. I tried the same thing with Dr. Schoenberg with a similar result, but I failed to make a record of just what he considered normal.

The water manometer was tried and that gave me approximately the same result; and as that is more convenient to manipulate I use it exclusively now.

Dr. Marple had seen Dr. Schiötz testing apparatus, and pronounced it quite similar to mine, altho he complimented me on one or two points which he considered superior to Dr. Schiötz'. He said my method of connecting the tubing to the eyeball was an improvement as I did not have any leakage there, while Dr. Schiötz, he said, was bothered considerably with leakage. Also I had constructed an apparatus which I called a pulsator, which simulated the blood stream pulsations in the eyeball of the living. This apparatus did not alter my readings but rendered them a little more delicate.

None of these men were able to give me any clue as to why the Schiötz and manometer did not agree. I then tried some experimentation on the living animal, a summary of which is given in my article referred to, and which generally showed much higher readings with the manometer than were indicated by the Schiötz tonometer.

I was particularly fortunate just about this time in being allowed to experiment on a person whose eye was to be enucleated on account of glaucoma. I did not think it advisable to alter the intraocular pressure by manipulating the manometer while the interior of the eye was connected to the manometer; but we were able to make some changes in intraocular pressure by manipulating the anesthesia.

After this eye was enucleated I was able to make comparisons and confirm the experiment. The results of this experiment were readings indicating 50 mm. of intraocular pressure by the Schiötz tonometer and 65 mm. Hg. by the manometer.

At this stage of the proceedings Dr. Marple, who had become greatly in-

terested, asked the privilege of sending to Dr. Schiötz one of my tonometers together with a diagram of my testing apparatus and the results of the tests he had seen, and the test on the human eye, as he claimed the distinction of bringing the first Schiötz tonometer into this country.

He wanted Dr. Schiötz' criticism of my apparatus and why we failed to get the same results as Schiötz. I granted this request and it was over five months after Dr. Schiötz received the tonometer and letter that he replied. In his reply he failed to criticize the apparatus and the method of testing, which was the sole object of Dr. Marple's letter. The only remark relative to the testing he made in the letter was "Dr. McLean evidently has values different from mine. I do not understand why."

I constructed the scale from an average of over 100 tests using several tonometers. According to my tests the normal intraocular pressure with the McLean tonometer has for its lower limit 22 mm. and its upper limit not above 40 mm. An upper limit of 40 mm. may be too high for some eyes. I have seen plenty of normal cases registering as high as 40; yet I have found eyes registering not above 36 mm. where there were evidences of glaucoma. On those cases I have tried the Schiötz tonometer also, and have been able to get readings as low as 22 mm. Schiötz.

Since the experiment on the first human case I have had the privilege of two other human cases, the results of which are cited in the article.

According to the literature I could find, Weber and Wahlfors are the only other men making direct manometer experiments on the living human eye in situ. I could not find any record of Weber's conclusions. Wahlfors' test (26 mm.), which he determined to be the normal intraocular tension of that case, is above Schiötz' upper limit, but it is quite within what I have found to be the limits.

At the time I was about to read the paper at the Academy of Medicine, the chairman of the section asked if I would have a physicist go over my apparatus with the purpose of taking part in the discussion. I could not get the Columbia professor because of his absence on Sabbatical leave. I did, however, secure Prof Green of the Boys' High School. He looked over my apparatus, then requested me to demonstrate the apparatus and use both the Schiötz and McLean tonometers. He made notes of his observations and reported the same in the discussion.

Unfortunately they had no stenographer present at that meeting and the report as given in the Archives is only what the secretary had in his notes of the meeting.

FLUCTUATIONS OF REFRACTION IN DEVELOPING CATARACT.

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This paper discusses the physiologic and pathologic changes of the crystalline lens in their influence upon refraction, illustrated by a case of developing cataract observed for many years. It was read before the Wisconsin State Medical Society, October 3rd, 1918.

The important part which the crystalline lens normally plays in the refraction of the eye makes it easily conceivable that certain changes of the lens must lead to alterations of refraction. These changes are physiologic and pathologic. The physiologic changes are a natural accompaniment of the growth (with the advancing years in the course of life) of the individual, and are of great interest for the understanding of the pathology of the lens. Most important are the alterations of the dimensions and shape, consistency, and coloration of the lens. During the whole of life new lens fibers are formed from cells at the meridianal rows of the equator of the lens, so that its volume and weight increase, from the twenty-fifth to the sixty-fifth year by one-third, its diameter by one-tenth. (Priestley Smith.[1])

The increase of the volume by this new formation of fibers preponderates over the apparent simultaneous loss of the water content of the lens which produces changes of the nucleus. In consequence of the larger volume of the lens the anterior chamber of older people generally is markedly more shallow. The growth of the lens influences its shape, from the almost spherical form of the lens, if left to itself, of the newborn, to the less curved anterior surface of the senile lens, whose sagittal diameter is smaller than its equatorial diameter. Perhaps the acquired hyperopia at higher age is due to this flattening of the anterior surface of the lens.

Physiologic alterations of consistency are due to sclerosis of the lens, a process which may be compared with the cornification of the epithelium. It is characterized at first by a gradually greater hardness of the more centrally located lens fibers from loss of water. A cross section of the senile lens frequently shows the nucleus dry without luster, the cortex moist and glistening. Hess[2] found in some cases the whole nuclear portion converted into a homogeneous mass, in which no single fibers were visible. The sclerosis increases the refractive index. Halben[3] showed that loss of water alone increases the refractive index of the lens. Whether the higher index in sclerosis is due only to loss of water or also to chemical alterations of the nucleus, e. g., the greater amount of the more refracting cholesterin (Jacobson, Matthiesen), is still uncertain. The nucleus seems to grow with advancing age by supplanting the soft cortex. If this is excessive, it may develop into brunescent cataract, whose brown color differs from the normal senile lens only in degree, not in kind.

Probably in consequence of abnormal loss of water another pathologic condition with apparently normal shape of the lens is created, viz., an abnormally great difference between the central and peripheral parts of the lens which may amount to a difference in refraction of from 10 to 16 diopters. Sometimes the turning of the ophthalmoscopic mirror in such cases shows a migration of the illuminated field in the central parts opposite to that in the peripheral parts. The center of the pupil may appear less bright than the periphery, and the border between them may be indicated by a dark shadow in form of a crescent or a ring. The ophthalmoscopic examination thru the central area of the pupil may reveal more or less high myopia and thru the peripheral area a lower degree of myopia, emmetropia, or hypermetropia. From the similarity of these phenomena with those of true lenticonus, Demicheri[4] termed them spurious lenticonus.

They occur in perfectly clear lenses or in lenses that may remain clear for a long time, but also as precursors of, or in combination with, cataract.

Vision may be considerably reduced, so that extraction is indicated, but in some cases it may be improved by correction of the nuclear myopia. Hess showed that from the 25th year with advancing age the difference between the index of the nucleus and that of the adjoining cortex constantly increases. The refraction of rays at the surface of the nucleus, at equal difference of index, must be the greater the greater the curvature of this surface. As the difference of index at higher age, in which this phenomenon exclusively occurs, is considerable, relatively slight differences in the curvature of the nucleus could essentially influence the refraction. Altho these differences of shape of the surface of the nucleus have so far not been exactly investigated, Hess considers their possibility, a priori, as not too remote to serve in the explanation of the phenomenon.

Another disease of the lens without opacity consists in the formation of radial clefts immediately under the capsule, which may remain transparent for a long time. They may be invisible in certain positions of the ophthalmoscope, but on slightly tilting the mirror may shine with a lustre and again appear as darker streaks. Vision may be more or less impaired, and the patient may complain of polyopia and metamorphopsia due to development of lenticular astigmatism. Gradually the contents of these clefts may become opaque and produce cataract. The affection resembles the first stage of naphthalin poisoning of the rabbit, in which Hess showed that the cataract is preceded by the formation of spokes clear as glass. In this stage, volume and weight of the lens are regularly increased. Becker[5] considered the fine, totally reflecting clefts in the deeper strata of the cortex as the first symptom perceptible during life of incipient senile cataract. Hess, however, proved that these clefts do not lie in the deeper strata of the cortex, but closely under the capsule. He considers this proof important for the understanding of the development of cataract. As is well known, the most frequent form of senile cataract is the subcapsular cortical cataract.

With regard to pathologic alterations of the epithelium Hess examined a large series of eyes affected with various kinds of cataract. The only changes which he could find with certainty in the great majority of these eyes with senile opacities, consisted in more or less numerous irregularly bordered, vesicular vacuoles, of which he could not say whether they lay between epithelium and capsule, or closely under the epithelium, between this and the cortical fibers. He never found them in eyes with perfectly transparent lenses, but especially in comparatively early stages of subcapsular cataract, sometimes scarce, sometimes in such quantities that they gave the appearance of fine vesicular foam immediately under the capsule. He thinks that they cannot be due to anything else but accumulation of small quantities of clear fluid under the capsule, or the epithelium.

Likewise with regard to the occurrence of clear clefts previous to the development of supranuclear cataract, Hess describes a visibly not opaque lens, in which he found a bright reflecting line parallel to the equator between cortex and nucleus, composed of numerous minute clear formations, and also a large number of finest fissures between the apparently normal fibers of the most peripheral layers of the nucleus. It gave the impression as if clear fluid had accumulated in very small quantities in these formations. Hess believes that at the beginning of cataract an intussusception of fluid takes place with the microscopically demonstrated destruction of the epithelial cells, to which he attributes the pathogenesis of subcapsular cataract and the young cortical fibers, which not only anatomically but also in their biologic properties are the more related to the capsular epithelium the younger they are.

To this corresponds the increase of volume of the lens in incipient cataract,

evidenced by the greater shallowness of the anterior chamber, as also found experimentally in the first stages of naphthalin cataract. Several cases were attributed to this stage of intumescence of the lens in which, in predisposed eyes, glaucoma was brought on by swelling of the lens. The myopia preceding or accompanying the formation of cataract has been ascribed to these changes. By intussusception of water into the cortex its index will be lowered and thereby the total index increased, and also the curvature of the lens may be increased.

In the progress of cataract to maturity the lens gives out fluid to the surroundings. Its volume and weight decrease and with this the depth of the anterior chamber becomes again normal, with decrease of refraction.

As an illustration of the refractive changes due to pathologic alterations of the lens, I should like to report one of a number of cases which I had under observation for many years:

An otherwise healthy, strong man showed, when first examined at the age of 52, emmetropia, and presbyopia. In his 64th year his sight became impaired. He had developed myopia and incipient cataract, at the peripheral cortex of both eyes. Vision was corrected by R. —3.50, L. —1.00, for reading R. —1.50, L. +0.75. At 65, V. R. 20/200, V. L. 20/100. His myopia had increased and was complicated by astigmatism. The ophthalmometer showed R. —1.00 180°, L. —0.75 180°. V. was corrected with R. —5.00 ⌒ —0.50 cyl. 90° to 20/30, L. —1.00 ⌒ —2.00 cyl. 90° to 20/20. For reading R. —3.50 ⌒ —0.50 cyl. 90°, L. —1.00 cyl. 90°.

In certain positions of the opthalmoscope the fundus of each eye was clearly visible, in others not, on account of sclerosis of the nucleus of the lens. The peripheral opaque spokes had not much changed. The anterior chamber was shallow. There was monocular polyopia.

In each of the following years the spheres and cylinders had to be increased, vision gradually decreasing even under correction. At the age of 70 he received the maximum, viz.: R. —10.00 ⌒ —2.00 cyl. 90°, V. = 20/100, L. —6.00 ⌒ —4.50 cyl. 90°, V. = 20/50. At 72 V. with these glasses was the same. V. without glasses was fingers at 6 feet.

The ophthalmoscopic examination revealed R. clear red reflex, dimmed in the center by the sclerotic nucleus, details visible, no changes of the retina. Cataract not progressed. Left Eye: The same picture of sclerosis with slight opacities at the equator. Sugar was found in the urine for the first time, but there were no other diabetic symptoms. It certainly had nothing to do with the affection of the lens.

At 75, details of fundus could be seen in left eye, not in the right. The sclerosis of the nucleus had increased. The swelling of the lens had decreased as indicated by the less shallow anterior chamber, and also refraction, which was now: R. —9.00 ⌒ —1.00 cyl. 90°, V. = 20/100, L. —6.00 ⌒ —3.75 cyl. 90°, V. = 20/50, i. e., vision had remained the same. It had not changed in the next four years, but myopia and astigmatism at 79 had further decreased to R. —7.00, V. = 20/100, L. —5.00 ⌒ —2.00 cyl. 90°, V. = 20/50.

At 81 V. with these glasses was, R. 20/200, a little less, V. L. 20/70. The ophthalmoscope showed R. faint red reflex, some opaque cortex on temporal side, clear on nasal side, nucleus opaque. Left: Cortex pretty clear except a few spokes, nucleus diffusely opaque, but details of fundus faintly visible. With R. —2.50 he reads large print; with L. —2.00 cyl. 90°, No. 1 Jaeger at 6 inches, No. 2 at 9 inches, and No. 4 at 11 inches. The patient was a very assiduous reader, and read with these glasses for many hours every day without discomfort.

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THE NONOPERATIVE TREATMENT OF SENILE CATARACT.

A. S. GREEN, M. D., AND L. D. GREEN, M. D.

SAN FRANCISCO, CAL.

This paper considers the etiology and forms of partial senile cataract, describes the method of treatment for it, and gives in statistics results obtained.

Senile cataract is a condition which concerns a very large proportion of the human race. While apparently more common among certain peoples than others, none are exempt. It may almost be regarded as an accompaniment of old age just as is gray hair.

One observer has found that opacification of the crystalline lens of greater or lesser degree is present in over 90 per cent of all people past the age of sixty-five. Among white races it occurs frequently as early as forty.

When opacification has begun, its rate of progress is very uncertain. A cataract may become mature in two or three months or it may remain immature for thirty-five years or more. Failing sight of old age, not correctible by glasses, is very often due to this condition. Fortunately this opacification usually takes place at the periphery of the lens, beyond the pupillary area, and thus does not generally interfere with vision. However, the pupillary region is involved with sufficient frequency to reduce the acuteness of vision in many elderly people.

ETIOLOGY.—Aside from the cataracts occurring in general diseases as in diabetes, or those following the ingestion of poisons as naphthalin, ergot, etc., and that which is frequent among certain vocations as in glass blowing, we know very little of its etiology. Neither do we know much about its prophylaxis. The question that interests us is: Can the progress of opacification of the crystalline lens be checked or prevented? The attitude of ophthalmologists generally has been that the condition must go on to maturity and the cataract then be removed surgically.

While it is absolutely unnecessary to allow a patient to await the blindness that comes with a mature cataract before resorting to operative intervention, it is also a mistake to operate before the development has reached such a stage as to interfere with business or pleasure. Roughly that stage is reached when vision has fallen to 50 per cent. When it has been reduced to less than 50 per cent there is no need to temporize further, and the cataract should be removed surgically. It is, however, before a loss of 50 per cent has occurred that nonoperative measures should be used to avoid subjecting the patient to an indefinite period of worry and impaired efficiency.

Many remedies have been suggested for the arrest or absorption of cataracts. But it has remained for Col. Henry Smith of Amritsar, India, to put the nonoperative treatment on a more definite basis. By that method in over 80 per cent of our cases, the opacification has been checked or the vision improved. But to obtain these results the treatment must be begun before vision has fallen to half of normal, and carried out in detail. The earlier the treatment is instituted the better the result. The permanency of the treatment is, however, uncertain. With some patients the improvement lasts only a few months, with others the improvement has remained after a period of over four years, the time when we first commenced this treatment. But if this particular treatment does not improve the vision it can do no harm as there is practically no danger from this procedure. We have not had a single deleterious result. Should an operation for cataract be necessary later it is probably an advantage to have had this treatment previously because of the apparent general improvement in eyes following this treatment. The greatest objection that may be raised is the severe pain often produced which may last for several hours.

TYPE OF CATARACT AND HISTOLOGIC CHANGES.—The type of cataract which

best responds to this treatment is the simple, uncomplicated senile with radial or diffuse opacification. Dense nuclear or subcapsular cataracts will not be affected materially by this treatment. The pupil should be first dilated in order to exclude retinal changes, especially the senile macular degenerations. These will often account for failure to obtain improvement in vision for which the treatment would otherwise be blamed.

Ophthalmoscopic examination of the lens after treatment will show little apparent change in spite of the improvement in vision as only the finest opacities seem to be affected rather than the larger ones.

METHOD OF PROCEDURE.—The patient should be in a bed in a hospital. Near the bed, within easy reach, should be an electric stove with a basin of hot boric solution for compresses. The eye is anesthetized with three drops of 4 per cent cocain solution instilled at intervals of five minutes. Twenty mm. of 1-4000 cyanide of mercury solution is drawn into a freshly sterilized glass syringe with a small needle. To this 2 mm. of sterile 4 per cent cocain is added. The needle is then inserted under the conjunctiva just below the external rectus and about 1 cm. from the limbus in an area free from blood vessels, and the solution slowly injected. A large bleb of conjunctiva is raised. The hot compresses are applied at once and maintained as long as the patient has pain. It is about the only thing that gives relief. A hypodermic of morphin may be necessary. The eye is compressed three times daily for three or four days afterwards.

The treatment as described above is that as given by Col. Smith. In addition to this the writers have found it of great value to institute auxilliary treatment that is carried out by the patient at home, over a period of from four to six months. One week after the injection the patient is given a 1 per cent solution of K. I. which is to be used as an eye bath in an eye cup for five minutes every morning, and every other night. On the alternate night the patient puts one drop of 2 per cent dionin in the eye. The strength of the dionin is increased 2 per cent each month until an 8 per cent solution is used. This method of using dionin and K. I. has been highly lauded by other writers, and used in connection with the Smith treatment we have found it very satisfactory.

The injection is given only once. Whether repeating the injection would be beneficial we are not prepared to say as we have not tried it.

The results given below were those obtained in private practice, and included 72 eyes.

	Cases	Per cent
Improved	42	58.5
Arrested	18	25
Cataract progressed ...	12	16.5

The degree of improvement in vision ranged from 11 per cent to 150 per cent. In twenty-five cases or 36 per cent of those injected, there was an improvement in vision of 11 to 40 per cent.

In sixteen cases or 22 per cent of those injected there was an improvement in vision of 50 per cent or better.

The period of observation ranged from a few weeks to four and one-half years.

The vision a day or two after injection is usually lower than just prior to injection, but improves very rapidly thereafter and reaches its maximum about one week after. The conjunctiva becomes greatly swollen so that it may protrude between the lids for a few days. The redness persists for three or four weeks. After this the eyes feel "stronger" and the patient reads and sews with much more comfort than before.

CONCLUSION. From our experience and the observation of others who have given the treatment a thoro trial, this method has been a decided help in conserving vision at a time of life when even a few months or years of sight is worthy of consideration.

NOTES, CASES AND INSTRUMENTS

OPTOTYPE FOR YOUNG CHILDREN.

JOHN N. EVANS, M. D.

BROOKLYN, N. Y.

We have all experienced the difficulties arising in taking the vision of young children from the so-called kindergarten test-charts. The very obvious failings of these, suggested this attempt to provide a system which will be at once practical and efficient.

In a review of the literature it was surprising how little careful work had been done along these lines. Such charts as are in common use—those of Reber, Seitz, Ettles, Wolffberg, Thorington, etc., represent fairly well the entire field, the most pronounced faults being in the selection of the characters:

1. Which are made in silhouette, line, shading and combination of these.
2. The names of which may easily be confused.
3. Employing a multiplicity of characters.
4 Which are markedly inaccurate as a measure of visual acuity.
5. Representing objects unfamiliar to the young child.

One factor which seems to have been neglected by many authors is the one of the child's physical condition. The charts are stated to be arranged for children and illiterates but it will be noted that they often present figures far beyond the child's comprehension. Surely we need the help of what little understanding the child has. Illiterates may be either mentally deficient or of normal adult mind, and the chart if constructed to reach the young child, can be followed by them, but not the reverse. With this in mind it seems fair to allow 50 per cent to favor the child's mentality and the other half to gain the visual acuity.

From a study of the statistics we find that the average child in the public schools of Greater New York does not know his letters in a dependable way until he can read, nearly the age of seven and a half, and though he may know his numbers slightly under this age, at six and a half years, he is likely to give unsatisfactory answers at the time of testing. In New York City the child enters kindergarten at the age of five, and elementary school at the age of six, so that these are the ones we need most to reach when the relatively heavy work takes its first toll.

In the construction of characters for a chart certain principles are to be followed:

1. The characters are to conform as nearly as possible to the international standard, particularly in structural and visual value.
2. A circle, or ring is to be used to form the body-structure on which the characters are built.
3. One-minute projections or interruptions of the body are to measure the capacity to perceive and recognize the individual characters.
4. There are to be few characters, as the child's vocabulary and concentrating ability are not to be overtaxed.
5. The characters are to be familiar to a child three or four years old.

In going over many characters used in kindergarten work, and in studying drawings made by small children, particular note was made of those which attracted the young child most and which he reproduced most successfully. After trying many of these it was found impossible to construct test characters from most of them, using a one-minute line and maintaining the five-minute size object. When finished most of them were so out of proportion as to be hard to recognize, or they formed undesirable black masses.

Those finally employed were:

1. *The Circle.* This is simply the body on which the others are built. It subtends an angle of five minutes, the rim is of one-minute width.
2. *The Cat's Head.* The circle forms the body of the character and each ear represents a one-minute mass. The features were made small so that the lower figures would not appear gray at six meters distance.

3. *The Man's Head,* built on the same circle is distinguished from the cat and other characters, merely by recognizing that the projections are at the sides, thus forming a hat-brim. The crown is formed by an arc of short radius. The brim is formed by one-minute masses.

4. *The Apple* is recognized by its stem which projects one minute above the rim of the circle and is the same in width.

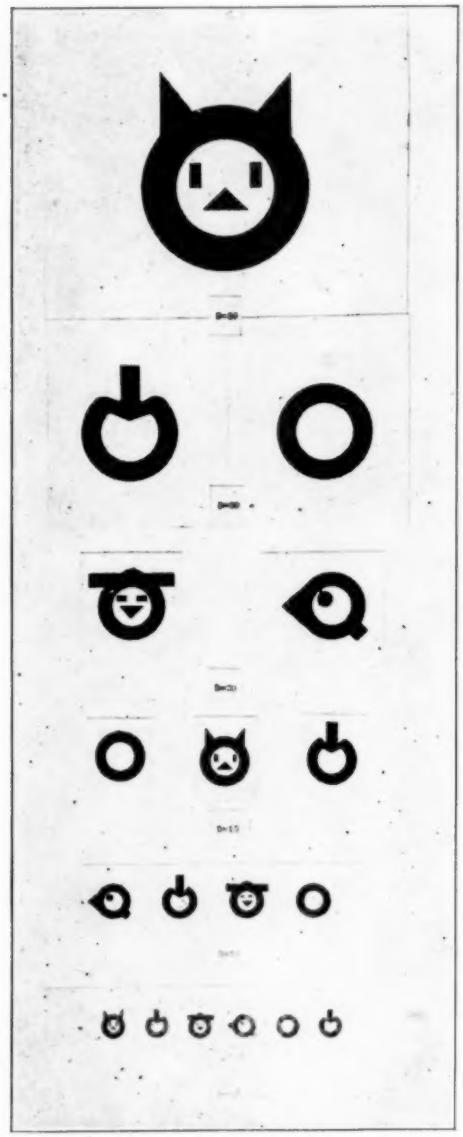

Fig. 1. Optotype for Young Children (Evans).

5. *The Bird's Head* is formed on the circle by adding a one-minute mass for a bill and another for a neck. The latter, as well as the eccentrically placed eye, seem necessary to make the picture complete to the child.

Much develops in the use of the chart which is of interest to the psychologist.

There are many names by which the other characters are called: Cat, fox, tiger, etc., man, monkey, pumpkin, etc., apple, cherry, plum, etc., bird, chicken, bird's eye, etc., circle, hoop, wheel, ring, etc.

Some of the advantages of this test-chart are:

1. The chart has given good results with children as young as three years.
2. It can be used with ease in dispensary and office work.
3. It is not necessary to describe or point to locate the one-minute section, naming the character is proof that it is seen.
4. It requires only simple direct answers.
5. The names of characters are not easily confused with each other.
6. There are many names for each character, allowing the child to answer quickly and not overtaxing its small store of names.
7. The figures are such as have been learned in the child's own experience and represent very familiar objects, as he himself draws them.
8. It is a very satisfactory test for any illiterate.
9. It may be used with mirrors.
10. It supplies a practical "one-minute" test.

INDICATIONS FOR OPERATION IN UNILATERAL CATARACT

Dr. Francisco M. Fernandez.

HAVANA, CUBA.

What should be the attitude of the ophthalmologist towards those frequent cases of unilateral cataract?

This subject has been debated and some authorized opinions have been

given in favor and against surgical intervention.

There are really many cases in which the opacity of the lens affects only one eye, while the other eye remains with a degree of vision normal or nearly so, but before giving our opinion about our way of thinking in these cases, we believe that they should be grouped according to their age.

The traumatic or congenital cataracts of children and early youth have often a hard nucleus and although they are rarely unilateral, and most commonly occur in both eyes, one should consider what to do in unilateral cases. In traumatic cases, which are as a rule unilateral, when there is no rapid spontaneous absorption, which so often happens, one should operate, after waiting for some time for the spontaneous absorption to occur[1]. Otherwise, if the cases are left unoperated, in many of them there may occur a strabismus more or less defined, due to the lack of control upon the affected eye and the disturbance of the normal binocular vision. With the operation, strabismus can usually be avoided.

Not all the cataracts of early youth are hard and it could be said that most cases are not, but it is convenient in all cases to operate by any of the different procedures in use. The one we generally follow is that followed by our worthy teacher[2] which consists in the discission or needling operation. We do not make use of the extraction method in order to avoid disagreeable complications, and in children one can practice a series of discissions without any of the dangers that may arise after a simple extraction. This method is also more easy to follow in children.

After the first 20 years of life, these cases vary in the treatment to be followed. Now we do not have to treat with the soft cataracts of children and youth, and the semisolid and hard cases are more frequent. The operative indications are not so imperative as in the previous series, but operation should be done in all traumatic cases, even after waiting some time for the absorption to occur. Even considering the operated eye, nonuseful from the standpoint of vision, on account of the high refraction of this eye as compared with the normal in the other eye, it is always a source of reserve to be used in a possible loss of the other eye, especially when the patient's occupation is a hazardous one.

The operated eye is really a reserve strength, and could be used only with a strong glass, but as this often produces some mortification to the patient, he ends by not using any correcting glass. This does not mean that the eye is worthless, and although there is no binocular vision, on account of the difference in refraction between the eyes, the operated eye can be used at times.

Concerning the esthetic effect, we agree with Zbikowski[3] that many people consider it a disagreeable thing to have a white pupillary space, as is the appearance in the affected eye, as compared with the normal black appearance of the pupil in the sound eye. This fact may be taken as another indication for operation in young people.

In old people, or people over 40 years old, the chief indication for operation in senile cataract should be the possibility of the other eye becoming affected and that the patient may become blind in both eyes at the same time. Another indication is when an over-ripe cataract may give rise to symptoms as of a foreign body in the eye and afterwards cause a secondary glaucoma.

What we have mentioned is in relation to cases of senile or uncomplicated cataract, but there is another group of cases in which the cataract is not senile, without being traumatic. We refer to some cases of cataract due to local affections like iritis, keratitis, and the like, and those due to some general disease like diabetes. In this group of cases our usual conduct is to refrain from operation in order to avoid unnecessary complications, but there are some cases in which an operation is indicated we do so by means of the combined extraction method.

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DIFFERENTIAL MYDRIASIS. ATROPIN, COCAIN AND EUPHTHALMIN.

GEORGE C. ALBRIGHT, M. D.

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It would seem that so common a subject as mydriasis and the action of the various mydriatics would be unable to furnish anything of interest. However, there has come under my observation a case in which the reaction of the pupils to the different mydriatics was so marked that it led me to an investigation of the literature on this subject. The scarcity of reported cases and the absence of comment on the different mydriatics would lead one to believe that the subject is not so common as at first supposed.

Mydriatics fall into two groups; those which produce mydriasis by paralysis of the myoneural junction of the sphincter pupillae, and those which produce their effect by stimulation of the dilatator fibers. Atropin and euphthalmin are examples of the first group, while cocain represents the second group. Both groups act locally (Roemer[1]). Cushny[2] points out this differential action very clearly.

It is an old saying that atropin paralyses the sphincter, while cocain stimulates the dilatator fibers. According to de Schweinitz[3] the existence of a dilatator muscle in the iris is denied by some authors, but the combined anatomic and physiologic evidence of its presence seems to be conclusive. All agree that there is a definite myotic tract and a definite mydriatic tract. It is also accepted that atropin acts upon the myotic tract, and that cocain acts on the mydriatic tract.

There may be also a marked difference observable in the reaction of the pupil of different individuals at various ages. As a rule (Jackson, personal communication) elderly people respond better to cocain than to atropin. In children the reverse is true. A few cases have been observed in which there is no mydriasis, following the use of atropin in adults.

The case which I wish to report is one in which there was a marked difference in the reaction of the pupil to atropin and to cocain; the former producing only slight mydriasis, the latter producing prompt, full mydriasis. The action of euphthalmin was also tested independently and found to be practically the same as that of atropin. I might note here that all the drugs used were fresh and that their therapeutic action was tested by direct comparison in the eyes of several other patients.

Mr. D., aged 54, laborer, consulted me January 2nd, 1917, for eye trouble which began about three months previous, when he was struck in the right eye by a piece of flying stone. There was some pain, no dimness of vision. The next day the eye felt fairly well. About one month later there began to be dimness of vision which gradually increased until now he sees only large objects. There is no previous trouble in the right eye; left eye, no history of trouble.

Examination showed right vision 6/60, corrected with myopic correction to 6/10; left vision, 6/6. Near vision, right J 12 corrected to J 1 at 22 to 28 cm.; left, J 6 corrected to J 1 at 22 to 48 cm. No muscle error, no ciliary injection, no conjunctival inflammation, no plus tension. Cocain 5 per cent, euphthalmin 5 per cent instilled in each eye. Pupils did not dilate well. Right fundus, fine floating opacities in the vitreous, no cataract, no evidence of glaucoma, no conus. Left fundus, negative. There was a badly deflected septum. Sinus examination was practically negative except for a slight amount of pus in each antrum. A diagnosis of uveitis, right, was made. The patient was put in the hospital on pilo-

carpin sweats. Locally atropin 1 per cent, dionin 5 per cent, were used; the pupils would not dilate. The atropin was increased gradually, even using powdered atropin, until signs of toxicity developed, the patient growing irrational, but still no dilation. The blood Wassermann was negative, none made on the spinal fluid. There was a marked local and general reaction to 1 mg. of O. T., and to 3 mg. of O. T. The patient observed that his vision was better after each injection of tuberculin The opacities were fewer, apparently. The vision was not tested.

January 8th, 1917, against advice he left the hospital. He came to my office, where the size of the pupils, 4 mm., was noted and cocain 5 per cent, and euphthalmin 5 per cent again instilled. Much to my surprise the pupils dilated to 7 mm. each, and I requested the patient to return to the hospital that the internes might observe the dilatation secured by cocain which we had been unable to secure with atropin.

From January 8th, 1917, to January 30th, 1917, I made numerous attempts to secure mydriasis with atropin and also with cocain. The results obtained were uniform with the first results above noted and were observed by several other physicians. It is worth noting that cocain each time produced good, prompt mydriasis. If instilled when the pupils were under the effect of atropin, mydriasis was secured a little wider than when not under the influence of atropin. When euphthalmin was used alone, mydriasis was secured between 4 and 5 mm.

Summing up my observations of the case; first, there was no mydriasis, either eye, secured by atropin carefully applied, pupils 3 to 4 mm.; second, euphthalmin alone secured some mydriasis, 4 to 5 mm.; third, cocain alone produced prompt mydriasis, 6 to 7 mm.; fourth, cocain, 5 per cent, and euphthalmin, 5 per cent, secured prompt mydriasis; fifth, cocain in the atropinized eye secured widest mydriasis, 7 mm.

Although having no bearing directly upon the subject, the patient's vision when he passed from under observation, January 30th, 1917, was unimproved but was as good as when first seen; 6/12 right, 6/6 left with correction. Repeated efforts to locate him since have failed.

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UNILATERAL OPTIC NEURITIS.

CLARENCE A. VEASEY, M. D., F. A. C. S.

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Two isolated cases are recorded below because it is believed there are some points of unusual interest pertaining to each.

CASE 1. *Unilateral optic neuritis following the extraction of senile cataract.* D. J. B., aged about sixty, was first seen February 18th, 1913. There was a macula in the center of the left cornea which, according to the patient, had been present since an attack of scarlet fever in childhood. The lens was cataractous and mature. Light perception and light projection were good. In the right eye the lens contained numerous opacities, but the cataract was not yet mature.

Extraction of cataract from the left eye was advised, the probability of the macula interfering to a considerable extent with the central visual acuity subsequently explained, and on July 3rd, 1913, the operation was performed by the combined method without complications. After healing the patient was glassed, obtaining 6/22 vision, but unable to read ordinary type because of the corneal macula.

On March 14, 1914, the cataract in the right eye being mature, it was extracted by the combined method. Patient was quite nervous during the operation and a small amount of vitreous was lost. Convalescence was uneventful, there being no further complications. On April 21st following, the thickened capsule was needled at the hospital. There was no complica-

tion and the patient read with glasses Jaeger 2, having 6/12 vision.

On May 14th, about three weeks later, the patient presented himself at the office, stating that he was unable to read the small type any longer. Examination showed a good opening in the capsule, the media clear, but the patient could read only Jaeger 6, and it was impossible to improve the vision beyond this amount. Further examination revealed what was apparently a swelling of the optic disc. Never having had the opportunity to observe a case of optic neuritis in an eye from which the lens had been extracted, it was rather difficult to determine whether the rounded edge of the disc was normal or pathologic. In two weeks more, however, there was absolutely no doubt, distinct optic neuritis being present. Vision which had been 6/12 with glasses was reduced to 6/45, and could not be improved.

Examination of the urine was negative as to albumin and sugar, but the patient was passing a somewhat smaller amount than normal. No blood examination was made. Examination of the nasal accessory sinuses was also negative. As this was before the time we were looking for focal infections, his tonsils and his teeth were not examined.

The fundus of the other eye could be distinctly seen, notwithstanding the macula, and there were no changes either in the media or in the optic nerve.

The patient was given the usual sweating treatment, together with mercury and the iodides, and on November 2nd, 1914, the swelling of the optic nerve had entirely subsided, and with glasses he could read with the right eye Jaeger 3, and his distant vision equalled 6/12.

It must be rather unusual to have an optic neuritis follow the extraction of senile cataract, either as a complication or coincidence, and the case is reported for that reason.

CASE 2. *Unilateral optic neuritis following a blow on the frontal region.* Mrs. A. H. M., a married woman, who had enjoyed apparently good health, consulted me September 4th, 1909. She stated that three weeks before she had received a severe blow on the forehead about three inches above the right eye. No disturbance of any kind was observed for two weeks, but about one week before presenting herself for examination she noticed considerable fogginess in the vision of the right eye. Two days before she was first seen only light perception remained. The vision was, for R., L. P., and for L. 5/5.

Examination of R. showed a marked and extensive optic neuritis, the edges of the disc being everywhere blurred, no hemorrhages being present. The media and fundus of the left eye were normal.

The patient's nasal accessory sinuses transilluminated well, there was no free pus in the nares and no indication of any sinus disease. No crepitus could be elicited.

She was given mercurial inunctions and rapidly increasing doses of iodid of sodium. In a few days' time the vision began to improve. On October 16th, 1909, the swelling of the nerve head had so subsided that the nerve was distinctly pale, and injections of strychnia into the temple were employed. On December 3rd, 1909, there was distinct optic nerve atrophy, so far as the pallor of the nerve head was concerned; but the vision for the right eye equalled 5/6+ and remained so until the patient passed from observation which was some months later.

It is believed that in this case the blow on the frontal region, altho a considerable distance above the orbital cavity, produced a periostitis or some other disturbance at the apex of the orbit which in turn gave rise to the optic neuritis. The patient having only light perception at the time of presenting herself for treatment and 5/6+ at the time treatment was discontinued is to be considered exceedingly fortunate.

SOCIETY PROCEEDINGS

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

Annual Congress held in London, May 1st, 2nd and 3rd.

President, Mr. J. B. Story, Dublin.

The President expressed his high appreciation of the honor conferred upon him by his colleagues, in electing him to fill the chair of the Congress. The Society, he said, was much indebted to its past Presidents, and to none more than Mr. Treacher Collins, who steered the bark of their fortunes through the stormy weather of the last years of war. It was largely due to him that the last Congress was such a success.

On that occasion the discussion on plastic surgery of the eyelids excited very great interest, and the exhibition of cases, photographs and casts made a deep impression on those privileged to attend the meeting, or who visited the Plastic Hospital at Sidcup. The same subject had been chosen by the Bowman Lecturer this year, Professor Morax. The discussion also on Contagious Diseases of the Conjunctiva, held at Swanley, was also a pleasant and important feature of last year's Congress.

He also expressed satisfaction that the Oxford Ophthalmological Society and the Midland Ophthalmological Society had become affiliated with the larger body. He was now happy to state that three other societies had also been affiliated: the North of England, the Egyptian, and the Irish.

Among the deaths during the past year, he wished to specially mention four, two of them Original Members—Dr. John Couper and Dr. Thomas Buzzard, Mr. Devereux Marshall had died in Bombay on active service, of cholera. He believed Mr. Marshall was at one time Secretary of the Society, and he had served on its Council. Another whose name he would mention was Sir James Mackenzie Davidson, whose work on the localisation of foreign bodies in the eye by means of X-rays was familiar to all. He concluded by a reference to the special subjects for discussion at the present Congress.

On the initiative of Sir Anderson Critchett, the President was cordially thanked for his address.

Abiotrophy of Retinal Neuro-Epithelium.

Mr. Treacher Collins read a paper on Abiotrophy of the Retinal Neuro-epithelium, or *"Retinitis Pigmentosa."* He pointed out that the pathologic examination of several eyes with retinitis pigmentosa had shown that the affection might occur without sclerosis of the choroidal blood vessels, and that the primary change appeared to be a degeneration of the rods and cones. As the condition is hereditary, he suggested that the degeneration might most aptly be described as an abiotrophy. From this standpoint, its various accompaniments might be explained as follows:

The increase in the neuroglia of the retina is similar to that met with in various forms of neuronic abiotrophy, and not like what occurs in sclerosis where there is an increased firmness in consistency. Secondly, the pigmentation of the retina is caused by the degeneration of the rods and cones, together with their attached nuclei, leaving spaces in the membrana limitans externa, through which the pigment epithelial cells, or their pigment granules, can migrate. Such migration he considered was probably due to the physiologic capacity for movement in the direction of light, which these cells and granules possess.

The light-coloured dots sometimes seen in the retina, and the hyaline nodules occasionally met with on the optic disc, are of the same nature; and are due to hyalin degeneration of cells derived from the outer layer of the secondary optic vesicle, from the pigment epithelium overlying the choroid, and

the neuroglia in the optic papilla. In typical cases the degeneration of the neuroepithelium commences where it is first fully developed. Around the macula, which, being last developed, is last involved. This is why sight begins to fail in the form of a ring scotoma.

Night blindness, the earliest symptom, is due to the failure of vision commencing in the part of the retina which, in the dark-adapted eye, is the most sensitive to light, that is 10° to 20° from the fovea. Typical cases of retinitis pigmentosa occur in which the macula alone is involved. There being no blood vessels at the macula, there are, in these cases, no branching pigment patches, only scattered dots and granules of pigment. The deafness and affections of the nervous system met with in association with retinitis pigmentosa are also due to abiotrophy.

Discussion: Professor Herbert Parsons remarked on the danger of labeling a diseased condition with a particular term, and considering that this explained it. Even if it were an abiotrophy, one had to get behind that and try to ascertain the causation. He did not think it would be difficult to oppose arguments to each thesis set up by the author, if there were time.

Sir Anderson Critchett spoke of the way subjects of retinitis pigmentosa were helped by wearing yellow glasses. He asked whether members had had experience with Crookes glasses (which take out the purple rays) for this condition. The subject was also discussed by Mr. R. Greeves and Mr. M. S. Mayou.

Sclerectomy for Glaucoma.

Mr. George Young read a paper on results of double sclerectomy operation for glaucoma. The paper was founded on 12 cases. The reduction in tension had been, so far, permanent: there had been no bad results over periods of several months to two years. The incision must be as near the limbus as possible, and he emphasized the necessity of making a second opening. The operation which he described could now be done on cases of acute glaucoma. It was not disfiguring and there were no relapses. The President considered the operation easy compared with other procedures.

Glaucoma Operations.

Lieut.-Col. Herbert contributed a paper on the future glaucoma operation. He said that in India cases of glaucoma were always far advanced when seen, and he had been driven back to the iris prolapse operation. An incision was made by puncture and counter-puncture, with a 1 mm. Graefe knife: the incision was entirely subconjunctival. In advanced glaucoma the incision could be safely made of almost any size. This operation was free from the disasters which might attend iridectomy for the condition. The whole operation could be performed without emptying the anterior chamber, and its chief feature was the sufficient widening of the filtration area. He described the technic in minute detail.

Contracted Sockets.

Mr. R. R. Cruise read a paper on contracted sockets in which he described a procedure to enable a socket which had been disorganized by injury to hold a glass eye.

Discussion: Mr. C. Higgens showed a number of soldiers on whom he had performed various operations for the same purpose, and demonstrated the procedure followed in each case.

Mr. W. Sinclair discussed Eye Complications in Cerebro-spinal Meningitis, and Mr. Percival J. Hay read a paper describing some new test-types.

Visual Requirements of Aviators.

On Thursday afternoon members assembled at the Psychological Laboratory, University College, where a discussion was held on the subject of Visual Requirements of Aviators.

Stereoscopic Vision.

Professor Spearman delivered an address on stereoscopic vision, which had been decided by many people, in-

cluding Americans, to be the most important factor in the visual fitness of aviators, especially in regard to successful landings, a source of much mortality among fliers. He divided his remarks into (1) a method of testing stereoscopic vision in candidates, (2) suggestions as to means of improving the vision of aviators.

This faculty had to be differentiated from quasistereopsis or the power of appreciating depth, which depended on the clues at the disposal of either eye alone. In stereoscopic vision, each eye had to form a good image, and that depended, principally, on the optical excellence of the iris. It seemed to be considered that for binocular vision all that was required was for both eyes to function, instead of only one. But there was only one visual field in consciousness, tho there were two ocular fields; and both ocular and conscious fields could not function with regard to the same spot at the same time. It was seldom that both eyes acted simultaneously: that was sometimes due to asymmetric astigmatism. It was important to try to find out how the ocular movements tested the balance of muscles. The eyes took up the right position for clear seeing if given plenty of time, but it did not necessarily follow they would do so when speed was essential. A test embracing the following of a moving field was therefore necessary.

Results of Ocular Examinations.

Mr. A. R. Brailey tabulated his results in the ocular examination of about four thousand candidates for the air service. The visual standard was, at first, very high, but later it was somewhat relaxed, and the fitting of lenses to the flying masks was permitted, and they proved quite satisfactory. Some officers asked for a difference in the shape, and others requested tinted glasses on account of glare. The lowest vision permitted was 6/18 with the better eye, 6/24 with the worse, corrected by glasses to 6/6 and 6/9 respectively. Binocular vision and a good sense of perspective were not always found to go together.

No rejections were made on account of faults of muscle balance, apart from actual squint. Flying failures were not found to be more numerous among the wearers of glasses than among others. Perception of the parallactic movement of objects he regarded as the all-important factor, but this he had found it difficult to assess by any test. When making a landing at a high speed, it was difficult to see the details of objects, and in that operation he did not think stereoscopic vision could be of great assistance. Little could be done in the way of correction of muscle defects by any form of training, however continuously carried out. Before candidates were accepted, details of their heterophoria should be available, both before and after treatment. For this service, a more important matter than acuity of vision in itself was the precision and rapidity of coordination between eye and brain: it was useless for a man to see perfectly unless he could accurately interpret, and act quickly in accordance with his perception. Flyers could not be selected by medical examination alone, any more than an efficient cricket team could be so selected from among the boys in a school: in flying, pluck, resource and response to stimuli were more important than medical perfection, especially in war time. Still, medical examination was important in regard to stress and fatigue, especially at high altitudes. Standards of light and color sensibility should be set up, so that parents could know, years beforehand, whether their sons were likely to attain to them. One very successful flying man in the service had 5 D. of myopia in each eye, and (probably as a result of wearing glasses) he had but indifferent binocular vision. A too stringent standard would exclude many otherwise desirable men.

Discussion: Major Clements said 26% of the men who came under his observation had glasses ordered, and they were turned down on account of bad landings. He described in detail the tests he employed and the results obtained. Of 294 men, 60% who were rejected on account of having made

bad landings had been in clerical or other close occupations. He had much of interest to say as to actual flying. The way in which the aviator knew whether he was flying level demonstrated the importance of good peripheral perception. The good flier looked at his horizon and used the nose of the machine as a protractor for measuring the flying angle.

Professor J. H. Parsons spoke of the need of research in this matter, of which the work done by Professor Spearman was a good example. This was the more needed on account of the already large amount of literature on the subject, too large a proportion of which was merely speculative. One of these important questions was that of heterophoria, and researches on the subjects coming within the scope of the present discussion should be against controls, as was the case in any well-conducted scientific inquiry.

Mr. Ernest Clarke spoke of the importance of testing under homatropin in every case, in order to exclude latent hypermetropia. Nearly all the men he had examined because they had crashed had hyperopic astigmatism, but they had been passed as what was termed "practically normal."

Col. Flack referred to the large range of capacity in candidates for the Service, and said that two very important questions had to be asked in this connection: (1) Was he likely to acquire the art of flying? (2) Was he likely to be able to stand the wear and tear of flying? He emphasized the point that a man with good arm and leg movement and coördination might fly successfully, even tho he might not have perfect vision. In regard to the second point, if a man's vision could be easily deteriorated by fatigue, that was a man one had to watch. But men's eyes could be greatly improved by rest and training. He thought a military pilot should have visual tests at varying altitudes for a period of at least one hour: An ophthalmic specialist should be there to test the vision. Even then much would remain to be settled. He thanked Professor Parsons for his suggestion as to research on this subject.

THE BOWMAN LECTURE.

Plastic Operations on the Orbital Region.

PROFESSOR MORAX delivered the Bowman Lecture, taking as his subject "Plastic Operations on the Orbital Region, Including Reflection of the Orbital Cavity, Eyebrows and Eyelids." The author opened with a felicitous acknowledgment in the name of France of the high honor conferred on him, and thru him, on French ophthalmology, by asking him to deliver this lecture.

He said the prime motive for wishing to restore the appearance of the face when functional disability was not present was the avoidance of the unsettling curiosity manifested by the people met in the street, with which must be coupled the fear that his obvious defect would cause a lessening of affection on the part of those he held in esteem.

There should be avoidance of the use of tissues in the formation of a flap in the regions of motor nerves, and the utmost degree of asepsis must be insisted on. He found the skin surface was sufficiently sterilized by sterilized soap and tincture of iodin; any organisms remaining on them were generally saprophytic. Hairy flaps sometimes harbored saprophytic organisms, and these might afterwards cause little foci of suppurative folliculitis. It was necessary to devise a method of securing more perfect sterilization of hairy flaps.

When the conjunctival mucous membrane was alone at stake, one usually succeeded with physiologic salt solutions, with instillations of zinc sulphat or silver nitrat. It was easier for the lacrimal mucous membrane to be a source of infection. Some failures in this region had been due to operations having been done when there was latent dacryostitis, and in such cases the extirpation of the lacrimal sac and its diverticula would alone be efficacious, the lacrimal canaliculi being excised.

With regard to repairs of injuries to the *brows*, by burning or the explosion of powder, when only one brow has been involved, it was easy to detach its breadth, leaving a nasal pedicle, then fixing the isolated flap in an incision made symmetrically on a level with the upper margin of the orbit. When both eyebrows are destroyed, there must be recourse to nonpedicled hairy flaps, and these were less certain in results. He used for these cases flaps from the occipital region, fixing them in position by several mattress sutures. One disadvantage was that the hair on the new flap grew rapidly, and one of his cases had to have his eyebrows cut when he went to the barber.

With regard to repairs to the *eyelids*, an extensive cutaneous destruction on a level with the lids was followed by an obvious modification of the palpebral fissure, and the mutilation would be even greater when it involved skin and subjacent tissues, muscle, etc. The first act in such cases must be to bring together the margins of the two lids, after having freshened the mucous margins in the usual way. In most cases, the union of the lids must be maintained for two or three months. Professor Morax entered into the technic in detail.

He proceeded to speak of repairs to the *orbital cavity*. When the wound received involved total or partial destruction of the eyeball and its mucous membrane, there was a shrinking scar of the orbit, and more or less complete adherence of the lid tissue to the orbital tissue, and these symblephara prevented the wearing of an artificial eye. Sometimes enucleation had been done by a surgeon who did not appreciate the importance of conserving every bit of mucous membrane. One must wait until the process of scar formation had been consolidated and there were no more signs of infection, before attempting to graft. Whenever possible, one had recourse to cutaneous pedicle flaps taken from the neighborhood. He described various types of cases, and the procedures adopted.

With regard to complete *symblepharon*, if all the mucous membrane were destroyed, the method described would have to be modified. He had found it best to openly expose the parts to be grafted, and keep them open until the graft was in good condition. In some cases it might be necessary to combine the dermo-epidermic grafting method with the pedicled flap one in total symblepharon. Professor Morax concluded by describing his methods of securing a mobile support for an artificial eye.

Eyesight and Education.

On Friday morning, at the Royal Society of Medicine, an interesting discussion took place on the subject of "Eyesight in Connection with Education."

Dr. James Kerr said that at the present time any examination of the relations between vision and education rested much on the testing for acuity at school, while such matters as fatigue, functional troubles, the ocular results of various kinds of work, and the risks of visual deterioration were scarcely noted by those having the oversight of education. The use of the Ives' grating and testing each eye separately did not yield fair results; the second-tested eye usually gave the worst record, and he now abandoned the method. He much preferred the copying of test types by children using both eyes, as this gave practically all the results required, and there was no waste of time. These results also provided a good basis for mass investigations.

The tables in the earlier Board of Education Reports showed a great variation according to the districts concerned: e. g., 19.5 per cent with bad vision in Newcastle to 4.4 per cent at Ashton-under-Lyne; 11.3 per cent Lancashire, 4.8 per cent Gloucestershire. By careful testing of very young children with test types, Dr. Margaret Hogarth got 86 per cent normal vision in 800 infants, and only 3.2 per cent cases of bad vision. She took every precaution to keep the attention fixed, and introduced a number of requirements.

The local variations involved na-

tional problems, and were due, no doubt, largely to preventable causes, but there had not been any investigation on the question. He considered they were closely related to the general surroundings and were closely connected with the general health. The results in eye testing were largely influenced by the condition of the general cerebral cortex. Fatigue was important in academic work, and ocular fatigue, tho masked by great accommodative range in the young, was a contributor to nerve fatigue.

With regard to myopia, four-fifths of the children passed through all the strains and troubles of school life ocularly unharmed, but the majority who suffered from it became myopic. The increase of myopia year by year of age was not correlated to education, but to age. In a large number of cases Inglis Pollock showed that up to the 14th year 7 per cent to 8 per cent were myopic, but after that age it jumped to 15 per cent to 19 per cent, and remained above that figure. About puberty there was a real increase in the myopia present, also during the convalescence following acute illness.

Sweden, by adopting classical education and Gothic print, had greatly increased the proportion of good vision in the country. He proceeded to emphasize the great importance in this connection of general nutrition. There should be careful measures to avoid glare and strong light contrasts, and children should be spared all unnecessary fatigue. He indicated the lines along which he thought further investigation should be carried.

Discussion—Mr. N. Bishop Harman dealt with the clinical aspect of the subject, and he left out of account children who had attained to some stability of tissue and whose vision was good according to accepted standards. The remainder of the school population included (1) the immature, (2) the defective, (3) the blind.

With regard to class (1) the instability of accommodation and of binocular vision in early years was notorious, and this instability must extend to other functions. Owing to the intimate relation of brain and eye, the effect of any form of close work on the child was serious. To the child, even the recognition of figures and letters was a mental feat, and he believed the eyes felt fatigued according to the degree of mental exertion. Adults had only to remember the ease with which they could skim over a novel for hours, yet felt fatigued by a comparatively short study of a scientific treatise. Yet the daily routine of the school child was comparable to the latter.

When one read of the average work required of the average infant, one was led to inquire what was the average infant, but there was, as yet, no answer. No steps were taken to ascertain what the eyes of any particular infant were like, nor whether its defects would render the child incapable of bearing up against the strain put upon them. Between the fourth and seventh years the infant went thru a training at school without any medical eyesight examination. The refraction could always be measured. He had examined the refraction of all the infants in a high-grade school in the West of London. The eyes of each child were anointed with a fresh preparation of homatropin and cocain in castor oil (2% of each), then the child was allowed to sleep for an hour. After the examination the eyes were anointed with a minute smear of 1 per cent eserin in oil, to effect closure of the pupils as quickly as possible.

In this way 368 children, of ages 4 to 7, were examined. Only 8 wore glasses. Only 8 had emmetropic eyes, but there were 232 hyperopes, viz.: 130 under 1 D., 73 under 2 D., while those with not more than 3 D. were 29. There were 38 who had more than 2 D. astigmatism. Only very few had myopia of any degree, tho one child had 18 D., 7 had scarred eyes, 23 had anisometropia of over 1 D., while 8 had squint.

The summary of his conclusions was that one in every three was not fit to do ordinary school work under ordinary conditions, results which were striking and unexpected. He strongly condemned the practice of submitting young infants to school

work without a preliminary examination of their eyes. There should be a definite grading of the little ones at these early ages. Indeed, the subject was sufficiently serious to warrant its examination by a committee of this society. He concluded by a description of special methods, such as those seen by members at their visit that day to the schools at Camden Town and Hempstead Road.

The subject was discussed by Mr. Harrison Butler, Mr. Ernest Clarke, Mr. Percival Hay, Mr. A. L. Whitehead, Mr. Inglis Pollock, Mr. Evans, Mr. C. W. Thompson, and the openers replied.

On Friday evening a series of papers were read and discussed.

Angioma of the Choroid.

Mr. Treacher Collins and Mr. Leslie Paton reported a case. The patient, a boy, first came under Mr. Paton's care in 1917, when he was 14 years of age. There was a large nevus on the left cheek and outer side of left orbit. There was detachment of retina outwards and downwards. The tension of the eye was then normal. Puncture of the sclera was made with the galvanocautery, but the vision did not improve. A year later, an acute attack of glaucoma occurred, and the eye was removed. There was found to be a lens-shaped mass in the choroid, measuring 9 mm. in length, 5 mm in breadth, extending from the upper margin of the optic disc to a little behind the equator. There were the typical appearances of cavernous angioma. In the partitions between the vascular spaces on its inner surface were well developed lamellae of bone.

Presbyopia.

Mr. Ernest Clarke read a paper on presbyopia, a subject which, in the author's opinion, had been very inefficiently treated in the past in the various text books. Presbyopia synchronised with important body changes. The "squeezability" of the lens decreased with age; and in the normal emmetrope, at 48 years of age, it had decreased to such an extent that the person was conscious of requiring aid for near work. This was not a disease, but a physiologic change, which affected all eyes alike. He considered that true presbyopia was entirely dependent on the lens, not due to any weakness of ciliary muscle, except in advanced age.

Presbyopia was felt most at the time when eye strain was most liable to occur, and Leonard Williams and others had shown the dangers of hyperthyroidism, especially in connection with intestinal poisoning, for when the thyroid gland was deficient, the gate was opened for the poisoning of the system by toxins. He advocated the wearing of bifocal glasses. A mistake commonly made in these was to give a too strong reading addition to them.

Evulsion of the Optic Nerve.

Col. Lister and Capt. M. L. Hine contributed a paper on the condition of evulsion of the optic nerve. The authors had been able to find records of only 22 cases, and only 4 with a pathologic report, yet during the war this condition of the optic disc had become familiar. It was recognized either by a hole at the optic disc, which might occupy the whole or a part of the scleral ring, or the disc might be filled apparently with white. In both cases the retinal vessels had either completely or partially disappeared. The tearing of the tissue resulted in gross hemorrhage at the back of the eye, so as to obscure the field for the ophthalmoscopic examination. When, as occasionally happened, little or no hemorrhage took place into the vitreous, the ophthalmoscopic picture was one of the most striking possible: a fundus oculi without vessels, an optic disc replaced by an apparently bottomless glaucomatous pit set in a background in which there were dramatic concussion changes. The paper gave a minute description of the changes found, and was supplemented by a number of colored pictures, shown by means of the epidiascope.

Bilateral Choroidoretinitis.

MR. E. HENDERSON read brief notes on a rare form of bilateral choroidoretinitis in a young child. The child, aged 6 years, was brought on account of occasional convergent strabismus of the left eye. After wearing correcting glasses and having the defective eye trained, the strabismus disappeared.

Two and a half years later, the sight having deteriorated, there was found in the right eye a brilliant white exudation to the macular side of the disc, in the center of which was a circular, partly pigmented patch. Some months later the left eye suddenly failed. A similar symmetric patch was found in the fundus, but accompanied by widespread exudation, and surrounded by some hemorrhage.

No source of infection could be found, and the Wassermann and tuberculin tests were negative. The scattered exudation gradually disappeared, and the appearance at present closely resembled that of the fundus of the other eye. He regarded the condition as due to some unexplained choroidal vascular lesion.

The following papers were also read:

Mr. Arnold Lawson: A New Method of Applying *Radium in Diseases of the Eye*, who described the rationale in collaboration with Mr. Sidney Russ. (2) Flavine in Ophthalmic Surgery.

Saturday morning was devoted to a *clinical meeting* at the Central London Ophthalmic Hospital, when many cases of interest were exhibited and discussed.

During the Congress, members visited the Day School for the Blind, Brecknock Road, Camden Town, the Myopia School, Exmouth, Street, N. W., and the Wellcome Museum, Wigmore Street. A dinner was held at the Welbeck Palace Hotel, and a museum of exhibits and specimens was established, under the care of R. R. James. On Saturday afternoon many members gladly participated in a golf match at Northwood.

ROYAL SOCIETY OF MEDICINE.

SECTIONS OF OPHTHALMOLOGY AND LARYNGOLOGY.

These Sections held a combined meeting on Wednesday, April 2, MR. W. T. HOLMES SPICER occupying the chair. The subject of discussion was:

Injuries and Inflammatory Diseases Affecting the Orbit and Accessory Sinuses.

THE CHAIRMAN expressed the hope that great good would come from the present meeting, which arose from the desire of ophthalmic surgeons to know a great deal more about the dangers which beset the precious optic nerve in its course from the eye to the brain. He remembered the time when there was but little expert knowledge concerning the ethmoid and frontal sinuses and when the departments of ophthalmology and laryngology at large hospitals were in charge of physicians, and the outlook upon them was purely medical. It was very important that the ophthalmologist should know when to call in an expert to deal with defective sinuses.

MR. L. V. CARGILL opened the discussion. It was, he said, surprising to find that cases of optic complications from sinus trouble were so few, because of the thinness of the partition dividing sinus from orbit. Ophthalmic complications might present themselves as functional disturbances, or as toxic effects. There might be contraction of the peripheral field, central scotoma, papilledema, papillitis, uveitis, episcleritis, subretinal effusion, retinal detachments, and so on. Nasal sinuitis was a chief cause of orbital inflammation. There was a small group of cases comprising retrobulbar conditions, and a larger one consisting of subperiosteal inflammations caused by extension from the nasal sinus. In ethmoidal cases, an acute specific fever seemed to be the usual primary cause. In young children, acute cases often responded to fomentation and good nursing. He asked whether the staff of ophthalmic hospitals should not include a rhinologist. If, in suspected

sinuitis, expectant treatment was not succeeding, an exploratory incision should be made without delay. In this war, the proportion of injuries inflicted by shell fire compared with those by rifle bullets was higher than in the South African war, and the sinuses had suffered in a correspondingly greater degree. Practically every case in which the wound was purely orbital had made a good recovery. The general results had been definitely aided by antitetanic serum, stereoscopic radiography, the telephone probe, and the electromagnet. No attempt had been made to remove deeply situated foreign bodies unless they were causing definite trouble. The essence of sinus treatment was efficient drainage and irrigation. He described and illustrated a variety of cases.

Mr. G. Seccombe Hett remarked on the benefit of such coöperation among experts, not only in regard to the more efficient treatment of war injuries, but also cases of injury met with in industrial practice and in disease. His experience during the last three years had been with cases from the war after their arrival in England. The best results followed free drainage and as little movement of bony and soft tissues as possible. Mucous membrane was stitched to skin, and was not taken away. In a number of cases he had been able to reconstitute an eye socket because the conjunctival mucous membrane had been retained. He showed an instructive selection of slides illustrating treatment in a variety of conditions.

Mr. A. W. Ormond based his contribution on the cases which had come under his care at the Second London General Hospital during the last four years, and in particular on 100 cases. He could not say that serious damage to orbit or sinuses had resulted in any subtle change in vision; the results were those of the original injury, or of inflammatory change set up by it. In some patients there was optic neuritis in the uninjured eye. Pain arising in consequence of inflammation of the sinuses was sometimes referred by the patient to his eye. In two cases, blind eyes had been removed on account of severe pain supposed to originate in them, but it was found to have arisen in the nasal condition. Sometimes a deep wound was found to have affected four sinuses.

Mr. E. D. D. Davis spoke of his experiences in this connection at casualty clearing stations. He had been struck with the frequent occurrence of a fissure-fracture of the roof of the orbit when making postmortem examinations in cases of bullet wounds of any part of the skull. Fracture of the anterior fossa was accompanied by diffuse intradural hemorrhage, and these cases usually succumbed in twenty-four hours. Even if this period was survived, death took place in from three to six days, from basal meningitis, due to infection of the wound cavity. In cases of sinus injury, he regarded early suture as very important. He asked for opinions as to the wisdom of draining severe orbital cellulitis through the nose. Suppuration of the antrum, of nasal origin, was nearly always accompanied by suppuration of other sinuses also, but in cases where the suppuration in the antrum was due to the condition of the teeth, the antrum remained the only cavity involved, and in such cases no retrobulbar neuritis had been recorded.

Mr. H. D. Gillies expressed his objection to the early suture advocated by Mr. E. D. Davis. In the honeycomb presented by the sinuses one could not excise the whole wound, and early suture meant giving a good deal of trouble in the later stages of (restorative) treatment. Excision of the wound in a fleshy part was quite justifiable, but it was not possible in the sinus region. In the next Bolshevik war the best practice would be found to be to keep entrance and exit wounds open as much as possible, so as to permit of efficient drainage until no question of suppuration remained. Very great benefit had resulted in the treatment of war injuries by the coöperation of the dental and the plastic surgeon, and he hoped much from the combination of the efforts of rhinologists and ophthal-

mic surgeons, of which this meeting was an earnest.

Mr. D. Leighton Davies spoke of the effects of nasal sinus affections on the fields of vision and on the ocular muscles. Some cases of heterophoria were secondary to sinus affections. The fields should always be studied, because patients did not make voluntary complaint in this respect. He had never met with a case of chronic nasal suppuration which did not show some changes in the visual fields. There might be scotoma, or an enlargement of the blind spot. When sinus disease had been operated upon, the blind spot enlargement subsided, only to again enlarge if the nasal trouble returned. Even when the field of vision was reduced to 10°, he did not find the patients complained of difficulty in orientation. If the sinus trouble had been long-lasting, its cure did not always result in complete restoration of visual fields. In discussing the etiology, he said no one theory yet advanced would account for all the cases. The discharge from the involved sinuses, being swallowed, set up a toxemia, which so spread to the eye. If that were true, one might expect to find contraction of visual fields in association with suppuration in other parts of the body, but he had not yet found that in sufficient numbers to warrant the drawing of conclusions. He had, however, found contraction of fields in cases of chronic suppurative osteomyelitis, chronic otorrhea, and leucorrhea with endometritis.

The debate on this subject was resumed on April 10, the chair being occupied by Dr. James Donelan, the President of the Section of Laryngology.

Mr. W. M. Mollison, in reopening, said most of the cases of the kind under discussion which he had seen were those which had been under the care of Mr. Ormond on account of damage to the eyes, and he did not see them until some months after the receipt of the injury. He had been impressed with the amount of time and trouble and suffering on the part of the patients which might have been saved if an ophthalmologist and a rhinologist had attended the cases from the commencement. This was especially so in the cases in which drainage into the nose might have been effected before any attempt was made to repair lids or sockets. When the latter had been done there was often a persistent pus discharge. He divided the cases he had seen into clean thru-and-thru bullet wounds, and secondly all other kinds. The usual result in the former was adhesion between outer wall and septum. Infection of sinuses was generally a sequel of the obstruction. All the cases he saw—at St. Dunstan's—were blind, some completely so. In one case, in restoring the nasal airway, he opened an adhesion between the septum and ethmoid, and infection of the meninges took place. The result appeared to be very good, but three weeks afterwards the officer developed meningitis and he died in three days. In some there was parosmia, due to damage of the olfactory nerve. Among the men at St. Dunstan's he found the sinus most frequently affected was the frontal; the proportion was 13 frontal, 2 antral. In some cases the deep wall of the sinus had been fractured and dura mater exposed. One man was wounded by a shell in May, 1917; shrapnel entered the right side by the canthus, and he had a sinus round the right inner angle of the orbit. At the operation a very extensive ethmoiditis was found, and there was a large piece of khaki clothing in the ethmoid, which had been there seven months. He had not yet discovered a case of sinus suppuration in connection with retrobulbar neuritis, tho he explored in a routine way with a Killian's speculum. He had seen only one case of orbital cellulitis which could be called idiopathic. It was that of a girl who was admitted into Guy's Hospital desperately ill. He could find nothing wrong with the sinuses. She died in two days of most extensive pyemia, and no primary source could be discovered. In 99 per cent of these cases he thought the sinus at fault was the frontal.

Mr. J. F. O'Malley said he had notes of about 60 cases of trouble in

nasal and accessory sinuses in which there were also eye lesions and injuries of the lacrimal apparatus. In the case of wounds of the ethmoid he had found that where there was previous obstruction sepsis was invariably present, and free incision and thoro drainage was needed. But he had been struck by the fact that in a large percentage of his ethmoidal cases there was so little spesis that extensive treatment was not called for beyond the removal of adhesions. In the case of gunshot wounds, there was great facility in healing once a good airway had been reestablished; this in contrast with ordinary ethmoid involvement secondary to nasal inflammation. Much the same could be said of antral lesions. Out of 50 thru-and-thru wounds of the antra he had only to operate on 11 for sepsis; in 11 others he operated for the removal of foreign bodies. He had 18 cases of eye involvement; in 10 the eye was lost, in 8 there were injuries to it of varying degree. Where the injury to the eye was not direct, it seemed to have been caused by the missile striking the malar bone, the shock of impact being communicated to the bony wall of the orbit. In some cases where epiphora resulted, this did not give much trouble in the ordinary way, but when playing games in a high wind, or motoring, the overflow of the tears was a nuisance. He thought the cause was hypertrophy of the inferior turbinate due to exposure to the winds, and as a result of its engorgement pressure was exerted on the tear duct. Removal of a portion of the soft tissue of the inferior turbinate seemed to cure this climatic cause of overflow.

Mr. G. H. Pooley said orbital cellulitis was often due to extension of inflammatory trouble in the superior ethmoidal sinus or from the lacrimal apparatus. In children, orbital cellulitis was often due to osteomyelitis in the frontal or ethmoidal region, and frequently these cases died. The best treatment was free incision, and the generous use of the sharp spoon. Defective vision due to nasal conditions he thought was attributable to pressure on the optic nerve, or to toxic influence of the retinal cells.

Mr. W. Stuart-Low spoke of cases in which edema spread to the canthus from inflammation of the frontal sinus. In some of the cases sent for operation, in which the middle turbinal was swollen and was blocking the passage, he avoided operation by using cocain and adrenalin, following that, after an interval, by fomentation. He did not operate until he had tried some such measures. Relieving the tension in a sinus, which might be due simply to serous fluid, was of great benefit. If these means failed, he received the patient into the hospital and incised freely under the eyes. He refrained from washing out the frontal sinus, for fear of driving infecting material into other sinuses. Removal of two-thirds of the middle turbinal often succeeded. He also made a practice of using a cage over wounds of sinuses and ears, to obviate pressure from outside, and he believed that had much to do with preventing or reducing subsequent deformity. Some of his lacrimal cases he failed to cure, and then he generally found some small foreign body was the cause of failure. He employed washing out in the case of the antrum, for its partition, tho thin, was complete. When a portion of shrapnel or casting was deeply embedded, he did not attempt removal unless it was giving the patient trouble.

Mr. Herbert Tilley showed photographs to demonstrate that ethmoidal cells and frontal sinus were developed quite early, even at three years of age. He also exhibited skiagrams of cases. He said that sometimes frontal sinus inflammation caused contralateral retrobulbar neuritis. Subjects of sinus suppuration seldom complained of eye symptoms, and even when asked directly about them did not admit such. In cases which had been referred to him by ophthalmologic colleagues, having gone to them because of retrobulbar neuritis, he seldom found sinuses involved, which he attributed to the fact that the originating nasal trouble had cleared up in the meantime. The rapidity with which eye

symptoms cleared up when nasal trouble was treated seemed to show that the cause was pressure of fluid rather than actual sepsis. Radical measures should never be undertaken during acute intranasal infection; it might mean disaster to the eye, or even to life. At this stage the surgeon should be satisfied with providing free drainage. He had seen iritis, cyclitis, and some internal affections of the eye quite cured by intranasal operations. He had never seen a case of orbital cellulitis in which sinus suppuration was not present.

Mr. Lawson Whale brought out, by means of an epidiascope demonstration of selected skiagrams from his war experiences in France and England, a number of points of practical importance in diagnosis and treatment.

After a few closing remarks by the Chairman, the four openers briefly replied.

H. Dickinson.

COLORADO OPHTHALMOLOGICAL SOCIETY.

March 1, 1919.

Dr. C. A. Ringle, Presiding.

Glaucoma Simplex.

H. R. Stilwill and Melville Black, Denver, presented a man of fifty-three years who had a simple glaucoma in both eyes, and on whose left eye corneoscleral trephining had been done. The patient had come on October 3, 1917, on account of moderate blurring of vision. The pupils were rather large and sluggish, the anterior chambers shallow, and the tension of either eye 55 mm. with the Schiötz tonometer. There was cupping of both disks, more marked in the right eye. The vision at this time was R. 4/4, L. 4/5. Under eserin the vision improved and remained normal until October, 1918, when it dropped to R. 4/5, L. 4/6. On January 17, 1919, Dr. Black performed sclerocorneal trephining on the left eye, combined with iridectomy. The vision before operation was R. 4/7, L. 4/20. The vision recorded on February 18, 1919, was R. 4/7 part, L. 2/60. The anterior chamber had remained completely empty for about a month after the trephining was done, and then gradually refilled. The tension then gradually came up, but was still subnormal (17 mm.). The reduction in vision had apparently continued speedily after the operation. The glaucoma cup, which had never been marked, was about the same. Dr. Black remarked that it was a serious question what was best to do for the other eye, since iridectomy had not proved very successful in simple glaucomas. The patient was approaching the point where he could not do his bookkeeping satisfactorily. The vision in the good eye was now 20/40 part, and eserin did not seem to be holding it, but the eye was changing for the worse fairly rapidly. The tension remained about 40 mm. all the time. The visual field of this eye showed comparatively little contraction.

Discussion. J. A. McCaw, Denver, mentioned a recent report in the literature, of a case in which atropin was used in the presence of subnormal tension and brought up the vision.

Dr. Black said that the operated eye had been kept under atropin until three or four weeks ago, but that the atropin had not improved the tension.

Edward Jackson, Denver, pointed out that the field which had been shown for the operated eye had been taken on the second of December shortly before the operation, and indicated that at this time the boundary of the field was cutting pretty close to the fixation point. The boundary was probably closer to the fixation point than the chart would show, as such patients do not fix very accurately. It often happens that operations on such eyes are followed by a further limitation of the field which carries it beyond the fixation point. In one case seen in consultation some years ago, the patient could read with the eye before operation, but after operation the eye was entirely useless. The operation is not to be blamed on that account, but this is one of the risks which have to be taken in operating on such an eye. The patient should probably be advised

to have an operation done on the second eye, and the best operation might be a Lagrange with a rather large iridectomy.

E. R. Neeper, Colorado Springs, was disposed to try the effect of the high frequency current, and would do a simple iridectomy on the second eye.

H. M. Thompson, Pueblo, emphasized the possibility of a toxic basis for glaucoma, and recalled a case which he had shown two years earlier in which removal of streptococcic tonsils had apparently checked the course of glaucoma.

C. E. Walker Denver, thought that it was seldom found that the points which Dr. Thompson had mentioned had anything to do with this form of glaucoma. A decrease of vision after operation was fairly frequent. As to the second eye, the reduction of vision under the best treatment made iridectomy the thing. In association with the iridectomy it would be advisable to use the procedure of Priestley Smith, scleral puncture with a Lang knife (slightly smaller than the Graefe), then through an incision one-fifth the corneal circumference to make a large iris excision, cutting first to one side and then to the other, and pulling on the iris until it tore.

Dr. Stilwill stated that the patient's physical condition had been gone over thoroly, but his teeth were perfect, and he had never had any illness apart from the eyes.

Dr. Black did not feel disposed to do posterior scleral puncture except as a last resort in blind and inflamed eyes. He was afraid of cutting a large choroidal vessel.

Dr. Walker said he had never cut such a vessel in doing this operation.

Keratoconus.

H. R. Stilwill, Denver, presented a man of thirty-four years the vision of whose eyes had been failing for the past six months. The uncorrected vision of the right eye was 1/60, of the left eye counting fingers at two feet. With R. —15.50 sphere combined with —3.50 cylinder axis 145 degrees the vision was 4/60, and with L. —15.50 sphere combined with —3.50 cylinder axis 60 degrees the vision was 4/15. There was marked conical cornea in each eye. The patient had been given a weak solution of pilocarpin. No disturbance of the corneal tissue except the conicity could be made out. The periphery of the cornea and of the anterior chamber could be seen thru the conical cornea better than with most eyes.

Melville Black, Denver, thought that we were disposed to overestimate the amount of astigmatism in these cases. He had found it pay to start in arbitrarily with an estimated plus cylinder and work behind it with a minus sphere, afterwards adjusting the axis of the cylinder.

J. A. McCaw, Denver, had found it advantageous to test such cases under pilocarpin.

Edward Jackson, Denver, advised treating these eyes with pilocarpin over long periods.

Vernal Conjunctivitis.

E. R. Neeper, Colorado Springs, presented a young man of eighteen years both of whose upper eyelids presented on the tarsal surface the typical cobblestone formations of vernal conjunctivitis. There had been the usual symptoms of redness, itching, swelling of the lids, and watering of the eyes, with improvement in cool weather. A sister had the same symptoms with a good deal of pain. The enlarged papillae inside the upper lids were rather distinctly pedunculated. The cornea of the right eye presented a superficial ulcer a little above the center. X-Ray and radium treatment had been advised, but not been used to date.

Discussion. Edward Jackson, Denver, referred to a case which he had reported some years previously to the Colorado Ophthalmological Congress. This patient had recently returned. He had got into the naval training school, but was finally turned down on account of his eyes. He had recently been put under radium, with beneficial results.

Shrunken Eyeball Following Pneumonia.

C. O. EIGLER, Denver, presented a girl aged four and a half years who was said to have had pneumonia with convulsions at two and a half years, and to have subsequently developed severe pain in the head over the left eye, lasting eight days. Upon recovery from this condition the eye turned in and was blind. The eyeball was small, sunken in the socket and soft. It was still sensitive to light in the mornings.

DISCUSSION. Melville Black, Denver, believed that the original condition had been a choroidal disturbance metastatic from pneumonia. It was probably better to leave the eye in a growing child, postponing the question of removal for later consideration.

Edward Jackson, Denver, suggested that if there was no irritation from the eye, it was just as well to leave it alone. It was, however, the sort of eye which might produce sympathetic irritation; and this, while not likely to destroy the other eye, might interfere with the use of the good eye. As regards the development of the orbit, Dr. Jackson had seen a girl of 16 whose eye was removed some fourteen years previously, yet it was impossible to discover any difference in the development of the two orbits.

C. E. Walker, Denver, emphasized the fact that in most of these old cases of choroiditis there was later on a bony formation which acted as an irritant, so that he believed it would be better to remove the eye before such a condition developed.

J. A. McCaw, Denver, asked how an opticociliary resection would serve in this case.

Dr. Black replied that enucleation would probably be better if the eye were keeping up interference with the use of the other eye.

Strabismus Under Voluntary Control.

W. C. BANE, Denver, presented a man of twenty-one years who had had a diverging strabismus of the left eye since childhood, without other symptoms. The divergence was probably sixty or more centrads, but was made difficult to measure by the ability which the patient had to draw the left eye in so that it was in line with its fellow.

DISCUSSION. C. E. Walker, Denver believed that in such a case the best operation would be an advancement, with in all probability a tenotomy at the same time.

E. R. Neeper, Colorado Springs, had never had much success with advancement, but got better results with resection.

Steel in Anterior Chamber.

E. E. MCKEOWN, Denver, presented a man whose left eye had been struck by a small piece of steel while he was driving a pin into a wheel. The foreign body had become embedded near the center of the cornea, and the home physician had unsuccessfully attempted its removal. On examination by Dr. McKeown the cut in the cornea was found, but no foreign body. The steel had apparently been pushed into the anterior chamber, in the angle of which it was shown by the X-ray, altho invisible to the eye of the examiner. Was it possible to remove the peace of steel from this location, or should it be left in place?

DISCUSSION. Melville Black, Denver, suggested the possibility of bringing the tip of the hand magnet into contact with the foreign body, but thought it might be well to wait a while and see what happened.

C. E. Walker, Denver, recommended the use of small tips for attachment to the giant magnet.

Edward Jackson, Denver. The value of the giant magnet is that it works at a longer distance. There is less power right at the tip of this giant magnet than there is an inch or so away. The small tips attached to it make it very much more more serviceable. A Dutch ophthalmologist has recently written a valuable paper on the withdrawal of foreign bodies from the anterior chamber. He uses a T-shaped incision, an incision parallel to the margin of the cornea, and an incision at right angles to it; and thus succeeds in getting out

foreign bodies which cannot otherwise be got at.

Sarcoma of the Ciliary Body.

H. M. THOMPSON, Pueblo, reported a case of mixed cell sarcoma of the ciliary body. The patient, a woman of forty-four years, first experienced visual disturbance in the right eye in November, 1915. There was a gradual development of pain in the eye and on the same side of the head. A little over three weeks later, after having failed to obtain relief from a nasal operation done by a traveling surgeon, she consulted Dr. Thompson. The eyeball was stony hard, the lens cataractous, and the general condition of the eye was that of absolute glaucoma. On opening the enucleated eyeball, a light gray mass, the thickness of a small pencil and slightly flattened, was found behind the iris, and taking origin from a definite point in the ciliary body. The other end of the cylindric mass was free in the vitreous. The ciliary body was not infiltrated by the sarcoma, nor had any other tissue of the eye seemed affected except by the changes incidental to the glaucoma. Dr. C. W. Maynard, pathologist, reported the tumor to be a mixed cell sarcoma practically free from pigment.

Calcareous Lens in Anterior Chamber.

EDWARD JACKSON and MELVILLE BLACK, Denver, exhibited a calcareous lens which had been removed from the anterior chamber, into which it had apparently migrated after remaining for a long time in the vitreous. The patient, a woman of fifty years, had apparently undergone two operations, at the first of which iridectomy was done on account of previous inflammation which had left the pupil adherent to the lens, and at the second of which (three years ago) the cataractous lens had been pushed back into the vitreous. The lens had come foreward in the anterior chamber three weeks ago, and had stayed there. The shrunken lens, yellowish white in color, was removed through a large corneal incision above. A more than the normal amount of aqueous humor escaped, the excess being regarded by Dr. Black as having come from the portion of the vitreous which had contained the dislocated lens. The eye then collapsed badly, but after waiting ten minutes it was possible to remove the cataract from the anterior chamber with a wire scoop. The wound healed readily and almost without reddening the eyeball. The extracted lens proved to be calcareous shell, six or seven millimeters in diameter.

WM. H. CRISP, Secretary.

CHICAGO OPHTHALMOLOGICAL SOCIETY.

A regular meeting was hald March 17, 1919, with the President, DR. WILLIAM L. NOBLE, in the chair.

Gumma of the Iris.

DR. N. C. NELSON exhibited a young man with a tumor of the iris which was diagnosed as a gumma. Patient had been placed under treatment with mercurial inunctions and the iodids, and the gumma had begun to disappear.

Dr. Noble asked how long it was since the iodids were begun, to which Dr. Nelson replied about two and a half weeks.

Xeroderma Pigmentosum.

Dr. Nelson also showed a patient stating that the case really did not be long to this department except that one could see the thickened condition of the lower lid and the ectropion, and in these cases the cornea generally became ulcerated. In other words, there was an ulcerative keratitis. The condition was known as xeroderma pigmentosum and generally began in the very young. It began from six months up to four or five years. The pigment very much resembled freckles which appeared on the exposed surfaces, such as the face, neck and extremities. The pigment became deeper, and a little later on there was a warty appearance as was seen in this case, and still later ulcers developed. The tendency was for this condition to take on the malignant epithelial type. The prognosis was generally fatal. The sun and wind

were the causative factors of this condition.

As far as treatment was concerned, there did not seem to be any outside of palliative treatment.

Up to 1870 there had not been many of these cases noted and reported, but between that time and 1910 there had been something less than 100 cases recorded in the medical literature of the United States.

DISCUSSION: Dr. Alfred Murray stated that in Fuchs' clinic, where over 20,000 new cases were seen annually, only two of the type presenting the condition described by Dr. Nelson were seen by him during the year that he was there; showing the rarity of this very interesting pathologic condition. These two cases were in sisters.

Dr. Nelson stated that the body was free from pigmentation where it was not exposed to the wind or sun. There was pigment on the hand, but as one went above where the clothes protected the body this pigment did not manifest itself.

There were no more cases in the same family. Occasionally more than one case was known to develop in a family. One physician had reported seven such cases in one family of which there were thirteen members.

One characteristic of the disease was that if the epithelial growth began early, the termination was likely to be more rapid than when it began late.

Dr. Smith asked Dr. Nelson why he did not treat the case of xeroderma pigmentosa with the X-ray.

Dr. Nelson replied that the case was sent to a leading skin specialist in Chicago in the first place, and he asked the specialist why he did not use the X-ray treatment, and his answer was that the disease was not favorably affected by the X-ray.

Hemorrhage Into the Vitreous.

DR. CARL O. SCHNEIDER reported the case of a man who, six weeks ago, had been hit in the eye with a pair of brass knuckles, which caused considerable hemorrhage into the vitreous.

Double Paralysis of the External Recti Muscles.

DR. E. R. CROSSLEY showed a case of double paralysis of the external recti muscles that had been operated on recently by Dr. Woodruff, who resorted to the transplantation of the external half of the superior and inferior recti muscles. The man was struck on the back of the head about six months ago, shortly after which this paralysis developed.

Dr. Von Der Heydt asked for further information regarding the case of double paralysis of the external recti.

Dr. Crossley stated that the object in showing the case was to refer to the transplantation of the superior and inferior recti muscles. This operation was described by Dr. Woodruff two years ago before the American Medical Association, at which time Dr. Woodruff reported two cases on which he had performed this operation. This was the fourth case. Advancements were done on both external recti before Dr. Woodruff had operated.

Dr. Noble asked whether there was any pull by either of the external recti.

Dr. Crossley replied that there was pull in both eyes. In the left eye there was a little deviation upwards, and Dr. Woodruff had attempted to correct that, but with what result he did not know.

Dr. Noble asked how long it was since the operations were done.

Dr. Crossley replied about a month as regards the right eye, and there was a week between operations. The first two cases were reported in the proceedings of the Ophthalmological Section of the American Medical Association for 1917, and in this paper Dr. Woodruff covered quite extensively the subject of transplantation of tendons elsewhere and in the eye. There was only a few such cases reported before that time.

Dr. Von Der Heydt said that two years ago he saw a case similar to the one shown by Dr. Crossley of paralysis of both abducens nerves in the same individual. It could not be justified anatomically at all. It should not be called a paralysis of both external

recti. The literature maintained that these cases were usually a convergence spasm, and that the origin of it was either some irritation in the brain, hysteria, or possibly multiple sclerosis.

Dr. Crossley stated that trauma was excluded in these three casas. He did not see how external trauma could paralyze both external recti, nor could he say anything about the origin of it any more than that the man was struck months ago and fell on the back of his head, and that was the beginning of his trouble. The man had gone through the operation of advancement of both external recti some time before, and had had no previous trouble.

Dr. Nelson said the man had had no previous trouble. He was on a drunk, got into a scrap, and came to the clinic the next morning with both external recti paralyzed. At present, after operation, he had considerable motion in the right eye, but in the left it was not quite so marked. The last operation on the left eye was only done March 14, 1919.

Enucleation of the Eyeball Under Local Anesthesia.

Dr. Austin A. Hayden read a paper on this subject in which he stated that local anesthesia, since Koller introduced cocain in 1884, had been the procedure par excellence in nearly the entire realm of ophthalmic surgery. Today general narcosis was not uniformly employed in eye operations except on the very young and extremely nervous patients; in septic conditions, where injections might carry infection to other tissues; in extensive plastics and in enucleations. In some of the last named the use of chloroform or ether might be so dangerous to the life of the patient as to be almost absolutely contraindicated. Local anesthesia then became a matter of necessity. A most satisfactory result in a case of this sort had prompted the presentation of his paper.

After detailing an interesting case in which he enucleated the eyeball under local anesthesia, he referred to the advantages or indications for local anesthesia in general: 1. Dangers and complications of general anesthesia are entirely eliminated. Among these are the immediate dangers, such as respiratory and cardiac failure, chloroform and ether poisoning and shock, as well as remote complications, such as postoperative and hypostatic pneumonia, myocarditis, and nephritis.

2. It is impossible to remove the wrong eye.

3. No preparation is needed, so that the operation can be done at once, and it is not necessary for the patient to be purged or starved.

4. No assistant is necessary.

5. The surgeon is relieved entirely of worry in regard to the patient's life.

The contraindications of local anesthesia are few: 1. Extreme youth or extreme nervousness on the part of the patient, probably also the latter on the part of the operator.

2. Purulent conjunctivitis and panophthalmitis, where theoretically a dissemination of the infection might result from injection of the anesthetic solution used.

3. Ruptures of the globe from panophthalmitis.

The author quoted extensively from the literature favoring enucleation under local anesthesia.

Discussion: Dr. Alfred N. Murray stated that Uhthoff in Breslau had done a great many enucleations under local anesthesia. After the muscles were released, he injected the cocain solution into the region of the ciliary nerves at the back of the eyeball through a long curved needle. The patients were able to talk to him during the operation and complained of no particular pain. The results were excellent. He did not think of giving a general anesthetic except to young children and nervous people, and ordinarily the patients came thru without any trouble whatever.

Dr. Thomas Faith stated that for a number of years Dr. Fisher and Dr. Hoffman had both done a number of enucleations under local anesthesia. Dr. Hoffman preceded the local anesthesia with H. M. C. He had personally done a few enucleations under

local anesthesia, but the technic described was one that he had not followed. In injecting the muscle attachments no attempt was made to penetrate the globe. He believed that the administration of the H. M. C. facilitated the work. He had done a number of enucleations with the aid of this combination under local anesthesia in patients who were so nervous that he was unable to do the work with local anesthesia alone, and yet they were patients to whom he did not wish to administer a general anesthetic. In his last case he resorted to the use of apothesin, a local anesthetic produced by Parke, Davis & Company, and said to be of no value except for injection into the tissues. It is of no value as a local anesthetic when applied to the mucous membrane. The result was satisfactory if the H. M. C. was given according to instructions. The first injection was usually given an hour before the operation and the second one was given half an hour before the patient was put on the operating table. Towards the close of the operation the effect seemed to be very satisfactory, and the patient experienced no pain whatever when the nerve was cut. Deep injections were made with the two per cent apothesin, the same as subconjunctival injections into the muscle sheath, and no cocain except four per cent solution was used and that was instilled at the beginning. One could use large quantities of apothesin; as much as two ounces had been given subcutaneously for extensive superficial operations and no deleterious effects ensued.

Dr. H. J. Smith asked why the essayist did not use novocain, which he thought was safer for the patient if he wanted to use any quantity. The injection should be made in the loose tissue of the orbit. Unless one placed the cocain solution very accurately he could hardly accomplish his object without using too much. With novocain one could infiltrate the entire orbit and cover the ground very well and at the same time keep within the bounds of safety.

He also asked Dr. Hayden why he injected cocain into the vitreous chamber. There might be a reason for this, but it was not apparent to him.

Dr. William A. Mann said he had operated on two cases and was pleased with the operation. He did not think it necessary to go through the eyeball to anesthetize the tissues back of the eyeball, as those same tissues could be reached by rotating the eyeball after the recti muscles had been cut. In the two cases on which he had operated the pain was not entirely relieved, although if he were to have the operation done on himself he would prefer local anesthesia to ether unless there was very marked sensitiveness of the ciliary nerves.

Dr. Hayden, in closing, stated in regard to the use of hyoscin, morphin and cactin that it properly came between local and general anesthesia, but he could readily see how it would be a distinct help for any local anesthetic procedure that might be attempted. Of course, the hyoscin was a powerful toxin and even in small quantities should be used very guardedly, and he did not know whether the use of those drugs together with the cocain that was employed was a good thing if a satisfactory degree of anesthesia could be obtained by the use of cocain alone.

As to the penetration of the globe, he simply wanted to try it. He figured it out this way: it was perhaps easier to penetrate the globe and reach the terminations of the ciliary nerve that lie around the optic nerve instead of going back of the ciliary ganglion along the path of the external rectus muscle. There was a difference in depth of about an inch. The ganglion was located nearly two inches back, whereas going straight through the globe the termination of the same nerves could be reached fully an inch further forward. It seemed to him that puncture and counterpuncture of the globe was attended by absolutely no risk, although he had only done this in one case. It was apparently quite easy to strike the sclera just to the temporal side of the optic nerve, and on the second injection to strike it just to the nasal side of the optic nerve by

rotating the needle about fifteen degrees.

Dr. Martin, from South Dakota, who happened to be in Chicago at the time, had witnessed the operation, and he felt that the severance of the optic nerve would be attended by great pain. So far as the speaker knew, the optic nerve itself was absolutely insensitive, but the small nerves which lie close to the optic nerve just before they perforate the sclera were sensitive. This was what was meant by saying that dividing the optic nerve might be attended by a considerable amount of pain. It was not the pain from the cutting of the optic nerve itself but the ciliary nerve branches in the vicinity. Lastly, if he was unfortunate enough to have to do many of these operations he would resort to local anesthesia.

As Dr. Murray had remarked, enucleations were done under local anesthesia as a routine procedure, in certain European clinics (notably in Paris). More of these operations could be done here in America, especially in selected cases, with great advantage to patient and operator as well.

Dr. Noble asked Dr. Hayden if he thought with a plus three tension he could have manipulated the eye without pain under cocain anesthesia, if he had not opened the sclera and reduced the tension?

Dr. Hayden, in replying, stated that he had the feeling the intraocular injections could not have been made without causing great pain unless the tension was first reduced.

In answer to Dr. Smith, he stated that there was no particular reason for the injection of the cocain inside the globe except this: The chances were it would be rather slowly absorbed into the circulation from the globe cavity, and that it was at least not dangerous if given in this location. In the second place, there might have been some chance of reaching the region behind the nerve through the return ciliary circulation.

Lenticular Lens for High Myopia.

Dr. Carl O. Schneider remarked that when prescribing concave lenses of about ten diopters or more, we were well aware of the excessive weight and thickness, and of the conspicuous rings or reflections of the edge that were present in concave lenses of the ordinary form.

To overcome these objections, the well-known lenticular lens, consisting of a plano or perfectly flat piece of glass with the concavity ground in the center, had long been in use. This form of lens gained only a slight reduction in weight and thickness, and it had the disadvantage of only a small concave area, and this area could be increased in size only at the expense of the objectionable added weight and thickness.

It occurerd to him sixteen years ago, while studying optics, and making diagrams of the course of a ray of light through various forms of lenses, that the combination of concavity in the center of a convex piece of glass would produce a lens suitable for the correction of a high degree of myopia, and which would contain a much smaller amount of glass, and at the same time admit of a larger concave area, than did the ordinary lenticular or any other form of concave lens then available.

Upon inquiry, he found that no lenses of this type had been made, and certainly none like it were in use before the time he applied for the patent which covered the subject of this paper.

He quoted from specifications on Patent No. 744,982 that was issued to him November 24, 1903, as follows: "The present invention consists in forming a concave lens by grinding a central concavity of the desired curvature in a main body portion of the required dimensions, and which body portion is of a double-convex, a plano-convex, or a compound-convex form. As so formed a concave lens for spectacles and like uses is produced containing a much less quantity of glass for a concave lens of a given focus and size than it had been possible to pro-

duce heretofore. The present invention also renders it possible to grind a concave lens with thin edges, and thus entirely eliminate the numerous objectionable and annoying reflections or rings which appear in a concave lens of the ordinary form. In addition to the foregoing, the present invention affords a lens of a neat and pleasing appearance, and its thinness at the margin permits of a very ready, neat, and substantial attachment to the spectacle rim or to the straps of a rimless mounting."

With the aid of the toric lens surfacing machine, it was possible by applying this same principle to produce the concave surface in an oval form, and the Schneider oval lenticular lens was undoubtedly the most beautiful concave lens that it was possible to prescribe for a patient having a high myopia.

In the author's experience, myopes of ten diopters or over would gain sufficient advantage by reduction in weight and by improved appearance to warrant the use of some form of this lens; but it was particularly in cases requiring a correction of about —20.00 D. or more that the patient was considerably benefited and invariably delighted with this new form of lenticular lens.

In obtaining this patent, the object was merely to definitely establish the fact that he had made this slight contribution for the good of humanity. No restrictions had ever been imposed against the free use of these lenses. No fee or royalty had ever been charged or collected under this patent, and he was permitting all optical shops to make any of these lenticular lenses without any financial obligation to him whatever.

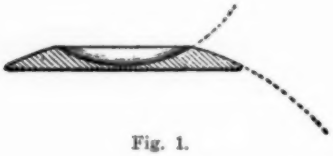


Fig. 1.

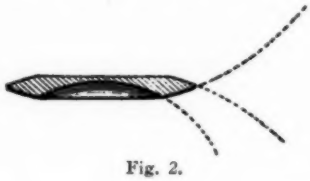
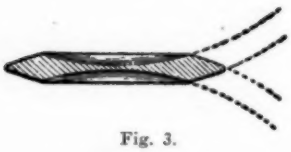


Fig. 2.



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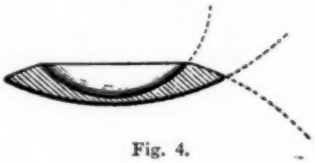

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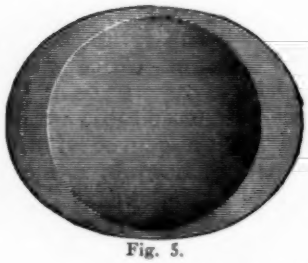

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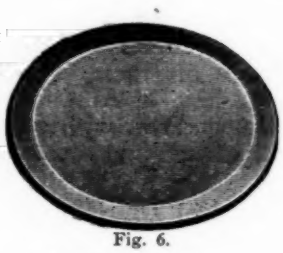

Fig. 6.

Figs. 1-6. Schneider's Lenticular Lens for High Myopia.

Discussion: Dr. Michael Goldenburg said he had been familiar with the Schneider lenticular lens, but did not know that a member of the society or resident of Chicago was the inventor of it. He had been using this lens for a number of years; it was a beautiful thing and gave much finer and clearer vision than any lens on the market.

Dr. Robert Von Der Heydt stated that owing to the present tendency toward larger lenses, the myope especially was very badly handicapped.

He had been using these lenses for years, and also used the toric lenticular lens in which the bevel edge was toric instead of plus sphere. It gave an oval instead of a round field, which made it a good looking lens. There was one optical company which produced a similar lens by beveling the edges by hand on the grindstone. He thought it would be a good idea to make these thick lenses out of flint glass having a higher index of refraction. In this way we should get a thinner lens diopter for diopter than with the usual crown glass.

While the subject of lenses was up for discussion, he would like to mention a very great and seemingly unavoidable defect created by prescribing kryptok bifocals where one eye was quite different from the other in refraction in the vertical meridian. When, for instance, one prescriped a lens for an individual that had minus two sphere for distance for one eye, and only minus one sphere in the other eye, a difference of a diopter, he was creating a hyperphoria. By using a prism in the lower segment that could not be avoided. In any individual, where there was a difference in the refraction of one eye as compared with the other in the vertical meridian, that difference would manifest itself in the reading segment by about as many tenths of degrees of prism as the difference in diopters. One was artificially creating a hyperphoria which could not be avoided in kryptok lenses as made at present. (Here Dr. Von Der Heydt illustrated the point by the aid of diagrams.)

At the request of the president, Dr. Schneider explained how the lens was ground and described the mechanical methods that were used by opticians in producing it.

ALFRED N. MURRAY, Sec.

ABSTRACTS

H. Weve.—Epidemic Parotitis with Iridocyclitis.—Tydschr. v Geneesk. Feb. 23, 1918.

Weve reports three cases of this disease, where he can exclude, with much greater certainty than Heerfordt could in 1909, tuberculosis, lues and pseudoleukemia; and he accepts on epidemiologic and clinical grounds as cause of the common epidemic parotitis.

It seems contrary to the literature that chronic iridocyclitis should be not a very rare localization of the virus of the epidemic parotitis. But this can be explained, as in most cases the iridocyclitis precedes some weeks the appearance of the parotitis. The parotitis is then considered as an intercurrent disease, for which the patient is treated by his family physician; and of which the ophthalmologist in most cases does not hear. Only in rare cases where the parotid swelling remains for a long time has the ophthalmologist a chance to think of a connection.

CASE 1. A 14-year old boy came with a double iridocyclitis to the clinic. The eyes were externally pale. The pupils reacted well, and there were some Descemet spots, fine posterior synechiae, and marked optic neuritis with slightly curved and strongly filled vessels. R. V.=5/5 Temp. in bed (three weeks after the onset) normal. Only once the evening temp. was 37.8° in axilla. Leucocytosis. Tuberculin TR up to 20 mgr. subcutaneously never showed any reaction. On discharge no Descemet spots. In L. only a few fine posterior synechiae and some fine vitreous dust and slight optic neuritis.

Four or five months after the first attack the patient returned with a marked painless double swelling of both parotids. The recurrence came without pain, and at the same time L., which had remained pale, had become strongly injected and painful. Fresh Descemet spots and a distinct optic neuritis were present. The lymphocytosis was somewhat increased, compared with the first attack. Some two months later, while the parotid swelling was still present a nodule formed in the left iris. No more Descemet spots were present. At the same time

some ten fresh Descemet spots appeared in O. D. and a nodule in the chamber angle, which looked somewhat like a beginning gumma. Slowly a double nodular iritis developed, which looked especially menacing in R. Strong increase of the number of Descemet spots, deep blue-red pericorneal injection, edema of the cornea especially down, diminution of V. in R. to about 1/4. Three injections of 20, 15 and 8 cm. subcutaneously of serum from a patient, who had recovered from epidemic parotitis were tolerated without disturbance or reaction. No favorable influence upon the ocular process was noted. The nodules grew in both eyes, the Descemet spots increased. Von Pirquet reaction was again negative. Radium was tried. R. was treated with 5 mgr. during 10 minutes, in 8 weeks 15 times. Fourteen days after the beginning distinct improvement was visible. The Descemet spots were reduced in number and size as against L., which had not received the rays. A month after the beginning the nodules in R. had become smaller, and three weeks still later they were nearly absorbed, the Descemet spots could be counted. Six weeks after the beginning the radium treatment R., which for a year had been refractory to every treatment, was entirely cured. V. after correction=1, 5.

As L. did not progress it also was treated, but to reach a quicker result the sitting lasted 20 minutes, nine in five weeks. This improved also, within 14 days. Within four weeks the large tumor had entirely shrunken and the hundreds of Descemet spots had disappeared except a few. V., which was before the radium treatment ⅓ improved to ¾. Condition half a year later: R. a few Descemet spots centrally. V=5/4+. L. a number of fine Descemet spots are visible down, optic nerve not sharply defined, V.= 5/4—.

Case 2. Mother of three healthy children, 28 years old. On February 1 peripheral facial palsy on the right side, which was healed three weeks later. A week after the beginning swelling of the left parotid; three weeks after this the right parotid also began to swell. After some two to three months they disappeared slowly. The lacrimal glands were not affected. In the middle of June the patient came under observation. She states distinctly that some weeks before the facial palsy L. had become cloudy. Only five weeks thereafter, therefore about the same time of the right sided parotitis, R. became blurry. In November V. was in each eye=1. Some fine vitreous dust and very fine, partly brown Descemet spots are still present. The strong posterior synechiae did not loosen.

Case 3. A 15 years old girl, had not been sick. L. began to blurr in the middle of April, and became red. A week later the left cheek, and again a week later the right cheek became swollen; and two weeks later R. became inflamed. Four or five weeks after the beginning of the inflammation of L. a left facial palsy appeared, which remained about a month. The menses stayed away during five months, after the beginning of the ocular affection. The painless swellings of the parotids had disappeared after two weeks. The ocular inflammation was not entirely cured after four months; then the condition of both eyes became worse and the patient presented herself at the dispensary. She was taken in the hospital and remained two months. R. being the worst was treated with radium twice a week during 15 minutes, 5 mgr. radium in copper tube with mica-plate. She received 20 treatments. After a few weeks, improvement set in. L. improved spontaneously. Three months after the beginning of the treatment only a small residue remains of the Descemet spots with a rather sharply limited opacity in the deepest corneal layers (=the toxic edema of Straub). A few small vessels go toward this infiltrate. After correction V.=¼, optic nerve very red. In L. a central group of the Descemet opacities with corresponding deep infiltration, a small deep infiltration medium and down and a few iris vessels, strong optic neuritis corrected V=1/6. [See A. J. O. June 1918. p. 433-4.] E. E. B.

Pacheco Luna. Study of Trachoma in Guatemala. (Guatemala, 1918.)

The author has found trachoma an exceedingly rare disease in Guatemala. In twelve years of practice, he has not been able to find the disease in creoles or natives. All are imported cases, which, he asserts, lose rapidly their contagiousness and do not infect natives, notwithstanding the bad hygienic surroundings and crowding prevalent amongst the people in cities.

He attributes this attenuation of virulence to the climate, but mentions also the fact that in France trachoma is rare, and not transmissible, the poor trachomatous Jews of the Bastille Borough in Paris, enjoying full liberty and never transmitting the disease to relatives.

The same thing happens in Mexico, where true trachoma is very rare. In the reviewer's experience only three in 1,000 of his dispensary cases developed trachoma. This rarity, however, is probably much more dependent on the scarcity of immigration than on climatic conditions. In some places of Mexico where immigration is active the number of trachoma cases increase and the natives are also infected. The same occurs in Argentina, according to Otto Wernicke.

URIBE TRONCOSO.

Lhermitte, J., and **Saint-Martin, de. Primary Polioencephalitis with Narcolepsy.** Ann. d'Ocul., 1918, v. 155, p. 487.

The authors report three cases appearing during the course of an epidemic in the early part of 1918, generally known as "Lethargic Encephalitis." The predominant features of this disease are ocular paralysis, narcolepsy or somnolence and alterations in the general health. The ocular manifestations are found in the initial stage, either preceding or closely following the somnolence. Unilateral or bilateral inward deviation of the eyeball and ptosis are the most striking ocular symptoms. In the first two cases of the authors, there was almost complete paralysis of all the branches of both motor oculi, altho the different branches were unequally affected. In the third case, the external rectus of each eye was affected. A review is given of the general symptoms and eye findings as shown by the experiences of other authors. The characteristic of the ophthalmoplegias is that they are disassociated and migratory. This, with the somnolence, would indicate a lesion in the peduncular region, that is of the nuclei of the III and VI nerves and possibly their connecting fibers. This has been confirmed by postmortem findings. It is an infectious disease, the agent of which has not been identified. C. L.

Frenkel, H.—Prognosis and Treatment of Ocular Wounds Due to Penetrating Foreign Bodies. — Archives d'Ophtalmologie, July-August, 1918, Vol. XXXVI, p. 193.

The fact that wounds of the globe due to penetrating foreign bodies give a much better prognosis in civil than in military life is due to the fact that in civil life the foreign bodies are, as a rule, single, whereas in military life they are generally multiple. This fact can often be determined by radiography of the eye in situ, but becomes much more apparent when radiography of the enucleated eyes is practised. This explains why in war work enucleation is often found necessary even after an easy and seemingly successful extraction with the magnet. In 59 out of 100 enucleated eyes chosen at random foreign bodies were found; 21 of the 59 showed a single foreign body, 38 more than one, one having more than 17, and 4 metallic dust. Most of these bodies were so small that their extraction was impossible even with the strongest magnets unless by chance the magnet came very close to them. In two cases there remained a second foreign body in the eye after the first had been extracted with the magnet. In spite of its drawbacks the large magnet is the more useful, the small magnet often giving negative results. Sometimes repeated applications of the magnet will be crowned with success; presumably the foreign body gets shifted into a position more favorable for its extraction. M. W. F.

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THE EYES OF THE AVIATOR.

If aviation had been achieved thru an evolutionary transition extending over countless generations, like that from the fish to the bird, it would have been attended with the perfecting of physical organization by the weeding out of countless defects, little noticed and of trifling importance while we walk on the earth, but fatal when we attempt to mount into the air. Among such defects, previously little thought of, are some of the eye and vision, that rise to tragic prominence with attempts at flying.

To speak of the air service as "the eyes of the modern army" is to keep as near the truth as figurative statement ever can. Blind Samson, the sport of his enemies, might well represent an army of today without its aviators. And if, by sacrifice of his own existence Samson could inflict terrible punishment upon the enemy, still it was only "schrecklichkeit," not military efficiency.

If salt that has lost its savor is useless, what is to be said of the eye that does not see things that safety requires should be seen? A scotoma, never appreciated as a defect in the field of vision, may hide an enemy until time for effective defense is passed. Color perception only slightly subnormal might make the observer fatally slow to pierce a disguise. A minor defect of motor coördination and balance may be of no importance while a man stands with his feet on the earth, yet it means disaster when attempting a difficult landing.

The experience of war has led to the relaxation of visual requirements in many branches of the service. But for air service it teaches that they should be made, if possible, more exacting, and should be rigidly enforced.

No material relaxation of them is possible without an increase in the proportion of fatalities, which makes those inflicted by the enemy look small in comparison.

The Major in the regular army whose son has a slight macular lesion, and minute relative scotoma with disturbance of muscle balance, never be-

fore noticed, cannot understand why his boy may not gratify his laudable ambition to become a flier.

The Congressman, who does not know the difference between the accommodation of the eye, and that of obtaining a small loan from his bank, does not understand why the government should be put to the expense of a physiologic laboratory like that at Mineola. Yet the Major would be inconsolable for the death of his son in the smash of a bad landing; and the Congressman would declaim most eloquently against the sacrifice of $50,000 airplanes to say nothing of the expense of the training and lives of needed officers thru the temporary disabilities produced by altitude or training in stunt flying necessary for attack or defense in the air.

There is great need for scientific men to acquaint themselves with the facts regarding the physical requirements for safe and successful aviation; and then to exert themselves actively in producing a public opinion that will support rigid requirements for the aviator, and scientific study of all the difficulties he has to meet and overcome. The book on Air Service Medical, elsewhere noticed in this number, should be read and studied by every oculist who wishes to keep in touch with the newest and most suggestive phases of medical thought; and at the same time get a new point of view for the functions and diseases with which he has to deal in his daily practice, and fit himself to perform his educational duty toward the public.

E. J.

RELATIVE SCARCITY OF TRACHOMA ON THE PACIFIC COAST.

Rarely does a writer remark upon the paucity of clinical material; rather is it true that he selects a subject for which he has gathered as many cases as possible.

This writer has been struck with the fewness of trachoma patients whose home is in the Pacific Northwest. This is the more remarkable because our population is easily eighty per cent transplanted from other sections of America, with a great mixture of the foreign element from all parts of the world. Of the latter there are race elements prone to this disease;—the Swedes and Norwegians, those from the Levant, Southern Europe and the Japanese. Odds and ends of peoples are found; even the Spanish-speaking Jews from the Marmora seacoast of Turkey, and as a contrast occasionally an Eskimo.

The coast Indian tribes are not at all afflicted with trachoma, while those east of the Cascade Mountains, and particularly those east of the Rockies, have quite a high percentage of sore eyes from this disease.

The writer finds quite a contrast in the last 10 years of his practice to the two decades spent in the Great Lakes Regions, as regards the prevalence of trachoma in private practice. His recent experience in Army Service corroborates the opinion that the affliction is not only not endemic in the Northwest, but that practically all cases here are imported, few arise de novo, or few contagions result.

We must then ascribe the relative immunity of our inhabitants to the climate, to the absence of dust and flies;—due to the cool, equable and moist climate as well as to the character of the soil, which is mostly a loam upon gravel or hard pan, there being little fine sand or clay to form dust. Then, too, our people live largely out of doors, even during our winter weather.

Conditions are different over the mountains where the intense heat of the summer with its dust and dirt and the rigors of the winter, with the fouler air of house living, give local causes of ocular irritation. Now are these not provocative causes for trachoma? Certainly the refractive conditions with the eye strain are not different here, neither are the other alleged causes of the disease. Thus the writer comes to the conclusion regarding trachoma that the moderate climate of the Northwest Pacific slope is

a favorable factor for its cure; and that these cases do not obtain here as often as elsewhere.

H. V. W.

OPHTHALMOLOGY FOR MEDICAL STUDENTS.

When American Medical Schools granted the M. D. after two courses of five months each; and the clinical teaching consisted of lectures to a hundred or two hundred students, with a patient for a text; or an operative exhibition where a dozen nearest the patient could observe part of the technic; and when the student could graduate without even looking thru a microscope; ophthalmology was supposed to be well treated if it received any attention at all.

The medical course has lengthened from 10 to 36 or 48 months. Clinical teaching includes section demonstrations, ward walks, individual study of assigned cases, and practical hospital interne work. The laboratory buildings are the chief buildings of the medical school, and in fundamental branches laboratory hours exceed those for lectures and recitations. But the improvements in the teaching of ophthalmology have not kept pace with this progress, and are not proportioned to the importance of the subject in its bearings on general medicine.

This teaching of ophthalmology to medical students in general is important to the ophthalmologist from two standpoints. It furnishes the start for his special training in ophthalmology, and it determines the point of view of the general medical profession with regard to ophthalmology, and their ability to coöperate with the ophthalmologist and appreciate the special services that he renders.

An interesting symposium upon such teaching is published in the *Edinburgh Medical Journal* for January, 1919. The writers are, E. Treacher Collins, Freeland Fergus, Wm. G. Sym, and J. V. Paterson, all competent ophthalmologists and experienced teachers. They agree that the time assigned to ophthalmology, "20 meetings," is inadequate; that 32 or 40 are needed, that most of these should be clinical, or demonstrations which might well extend over more than one hour each.

All of these writers agree that certain things of importance in general practice, like ophthalmia neonatorum or glaucoma, should be taught and emphasized. But it is pointed out that only a part of the students, one in five according to Fergus, will profit much by work in refraction.

Collins and Fergus dwell on the need for teaching every medical student to use the ophthalmoscope, Collins enumerates the questions it will settle with regard to general diseases, and its value in training to exact observation. Paterson says it should be taught as early as possible in the course, and used in every clinic in the latter clinical part of the course. Fergus would have the student become as familiar with its use as with that of the clinical thermometer.

It might be urged with even greater force that every medical student should use this instrument for the ophthalmoscopic study of pathology. A particularly weak point in the improved, extended medical curriculum is the wide gap between the study of pathologic changes in the dead body, and the study of symptoms in the living. The ophthalmoscope making possible the study of pathology, day after day, in living nervous, vascular, and connective structures, should be made to bridge this gap between fundamental and practical training; and bring laboratory exactness to the study of symptomatology.

It is a good sign when four such ophthalmologists as those above mentioned are asked to contribute to a series of discussions of general medical education. The proper undergraduate teaching of ophthalmology should be urged by ophthalmologists everywhere, until its importance is appreciated by the whole medical profession.

E. J.

BOOK NOTICES.

Air Service Medical: War Department: Air Service Division of Military Aeronautics. Octavo. 446 pages. Illustrated. Washington, D. C. Government Printing Office, 1919.

This large book, bringing up the medical history of the air service to March, 1919, will be of great interest to the medical profession in general. We can only note here the parts that refer especially to ophthalmology, and certain sections bearing on general function and nutrition that include notable effects on the eye. It is "for educational purposes that the Director of Military Aeronautics deemed it advisable to issue this book. Its object is to set forth Aviation's debt to Medicine, and to make clear the part played by the Air Medical Service in the winning of the war in the air."

This work is sharply divided into three phases, the selection of the flier; the classification of the flier; and the maintenance of the physical efficiency of the flier. In the selection the object was that no aviator should "fail in his mission against the Hun because of discoverable physical defect." The importance of this was not at first appreciated by anyone, and is still not understood by those who have not sufficiently studied the matter. The approximate statistics thus stated are startling. "When it is stated that 2 per cent of the total number of fliers incapacitated for further air service are put out by the Hun, and 8 per cent because of mechanical shortcomings of the airplane, the remaining 90 per cent looms large when it is realized that this proportion represents troubles in the flier himself."

In the light of experience, the minute investigation of the special senses and general physical fitness of applicants for the air service, that have been often adversely criticized is more than justified. Men were rejected, not because they could not fly, but because under the stress of air battle some slight discoverable weakness or tendency would turn the balance against them.

We can safely claim that never before have any large number of men undergone such minute searching and scientific examination as the fliers for the American Army.

Among these examinations the visual and ocular occupy a very important place. In the 67 units established for such examination 176 ophthalmologists took part in the work. The investigation they conducted in every instance covered the following points:

1. History of previous or present eye trouble.
2. Stereoscopic vision.
3. Ocular movements.
4. Pupillary reactions—direct, consensual, accommodation.
5. Intraocular tension.
6. Any visible lesion of the eye.
7. Nystagmus.
8. Field of vision.
9. Color vision.
10. Muscle balance at 20 feet.
11. Visual acuity — distance, near point.
12. Ophthalmoscopic findings with dilated pupil.

The schedule is one that may well be made the basis of any scheme for thoro ocular examination. The illustrations and descriptions here given of the conduct of such an investigation make this work an extremely valuable guide for anyone desiring to perfect himself in methods of ocular diagnosis.

Of the men presenting themselves as applicants for the air service, 29.3 per cent failed to pass the physical examination; and of these 5.9 failed in the eye examination alone; 7 per cent in two tests, and 8.6 per cent in three or more tests. Practically 50 per cent of those rejected failed to meet the eye requirements. Of 59 thus rejected for eye defects, 33 had low visual acuity, 10 had defective color vision, 7 imperfect muscle balance, 5 lacked stereoscopic vision, and 3 were eliminated because of the ophthalmoscopic evidences of disease.

The effects of altitude or of oxygen deficiency on ocular functions, particularly visual acuity, accommodation, the field of vision, and motor coördination

is so important, and so much light has been thrown upon the subject by the laboratory researches carried on in connection with the Air Service Medical, that it will be considered separately in a later issue.

It is rarely that a volume of solid scientific worth contains so much of dramatic interest and romance. It is worthy the careful perusal of anyone who can secure it.

E. J.

Revista Cubana de Oftalmologia. Published quarterly. Dr. Francisco Maria Fernandez, Editor. Dr. Jesus M. Penichet, Secretary. Havana, Cuba. Subscription Price, $6 per year.

It is not often that a new ophthalmic journal has a chance to fill a real and long felt want; but this one has that opportunity and uses it admirably. The first number is put out as a double number covering the first half of the year 1919, and consists of 226 pages, of which 14 are given to a biographic section, 112 pages to original papers, and the remainder to progress of ophthalmology and reviews of ophthalmic journals and societies, with notices of deaths, and miscellaneous items.

The biographic section contains 6 biographies, each accompanied by a half tone portrait. Of the 24 original papers, 2 are illustrated. The paper used and the press work are good; so that the Revista Cubana makes a better appearance than any ophthalmic journal heretofore printed in the Spanish language. We know enough of the work of Drs. Fernandez and Penichet to feel sure that this will be an addition of real value to the ophthalmic journals of the world. Spanish-speaking countries, especially those of America, have recently manifested an active and productive interest in ophthalmology. Thru this channel they will have something of real worth to offer to the general store of our literature.

E. J.

Section on Ophthalmology, American Medical Association. Presession Volume for 1919. Edited by the Secretary, A. E. Bulson, Jr., pages 307. Illustrated.

This volume, altho printed and circulated, is not published. It is distributed free to those who have registered as members in attendance at a meeting of the Section within the last five years. It is the most valuable piece of free ophthalmic literature we know of. On the other hand, those whose papers are thus distributed have 1,000 or 1,200 reprints of their papers sent to the most appreciative list of readers, for much less than they could get the same number of reprints sent any other way.

It might be objected that this duplicates the volume of Transactions to appear later. In a way it does; but it adds greatly to the value of that volume by bringing out discussions of much higher value than could be had without this; and those discussions will be a most valuable part of the Transactions.

E. J.

BIOGRAPHIC SKETCHES

Thomas Hall Shastid

SUPERIOR, WIS.

Urban S. Bird. An ophthalmologist and oto-laryngologist of Tampa, Florida, well known thruout the South. Born in 1867, he received the medical degree at Tulane University, New Orleans, in 1895, and at once settled in Tampa. Ten years later he went again to New Orleans, where he studied ophthalmology and oto-laryngology for two years. Returning to Tampa he practiced there as ophthalmologist and oto-laryngologist for the remainder of his life. He was a member of the American Laryngological, Rhinological and Otological Society. and a surgeon of U. S. volunteers during the war with Spain. He also held a lieutenant's commission in the American Army during the Great War, and was honorably discharged Dec. 5, 1918. He died Jan. 11, 1919.

WILLIAM CHEATHAM. One of the best known eye and ear specialists in Kentucky. Born in Taylorsville, Ky., June 6, 1852, son of William H. and Elizabeth (Vandyke) Cheatham, he removed with his parents to Louisville while still a mere boy. In 1873 he received the degree of A. B. from the Kentucky Military Institute at Frankfort. Three years later he received the medical degree at the University of Louisville.

Going to New York, he became an intern in the Manhattan Eye and Ear Hospital and at the same time a private pupil of Dr. Cornelius Rea Agnew, that famous teacher of so many excellent ophthalmologists. Having completed his course under Dr. Agnew, he studied his specialties further in London, Paris, and Vienna.

Returning to Louisville, he began at once to practice as ophthalmologist and oto-laryngologist, and soon had an excellent practice. He was promptly given a lectureship at the University, and, soon after, the full professorship. At the time of his death he was Professor Emeritus of Ophthalmology, Rhinology, Otology and Laryngology. He was a member of the American Ophthalmological Society, and a Fellow of the American College of Surgeons.

Dr. Cheatham married, Oct. 2, 1879, Miss Nellie Garrard, who died a few years ago.

In the latter part of 1917 Dr. Cheatham began to notice a certain recurring weakness of the heart. Early in the present year the attacks became more serious, and, in the afternoon of April 3, 1919, the doctor left his office, walked into the corridor of St. Joseph's infirmary, and said to the sisters who greeted him, "I have come over to die." Three hours later he had expired. Dr. Cheatham was survived by a daughter, Mrs. Joseph R. Baker, of Evanston, Ill., and a sister, Mrs. E. D. Borne, of Taylorsville.

Dr. Cheatham was a man of great nervous energy and a tireless worker. He was often said to have treated gratis more patients than probably any other doctor in Kentucky. It is further said of him that he secured a reduction in the price of optical goods for those for whom he had prescribed, and who could not afford to pay the full prices. His love for animals was very pronounced, and he had many pets. Among these were three little rat terriers, Chita, Minnie, and Cricky, which he himself would always feed and on which he lavished much attention and care. He used to say that they helped fill the void in his life caused by the loss of loved ones. He had also a number of parrakeets, which whistled and chattered in a cage in his reception hall.

As to further characteristics a friend has written: "He was a man fond of good reading, of the classics, and he had many beautifully bound works in which he took delight. A collection of Hogarth engravings also was one of his possessions in which he took much pride. His Chestnut street office and home was filled with a number of curios, some of great historical value. Many of them were Civil, Mexican and Revolutionary War relics. He had a number of foreign weapons, some of ancient date, many of which had been used by noted persons. Never did he fail to entertain a visitor or patient with some interesting things which he had picked up here or there on his travels or which had been given him by those who knew of his hobby. Some valuable cloisonne vases were among his collection." Yet another friend has written: "In his day the most distinguished eye, ear, nose and throat specialist of the Southern country, Dr. Cheatham was never too busy to attend a patient, nor was a patient ever too poor to command his most scrupulous service. He believed that the art he was born with and the science he acquired through years of faithful study belonged to mankind, and so he used it. . . . To the public, there was never a truer friend; to his patients, there was never a less sordid healer; to his friend, there was never a finer comrade than Dr. Cheatham. The light fades from his tired eyes to live forever in the recollection of those who loved him."

GEORGE ANDERSON CUBBISON. A well known ophthalmologist of Erie, Penna. Born in 1863, he received the medical degree at the Western Pennsylvania Medical College, Pittsburgh, in 1897. He died at his home Dec. 21, 1918, after a short illness from pneumonia. He was a Knight Templar, a Shriner, a member of the Temple Band. He is survived by his widow and two sons.

MITCHELL MIKKELSEN. An ophthalmologist and oto-laryngologist of Wells, Minnesota. He was born in Dane County, Wis., July 27, 1850, son of Knute and Caroline (Erickson) Mikkelsen. At the age of 22, in 1872, he homesteaded 160 acres of land in South Dakota, where, on a number of occasions, he had serious difficulties with the Indians. Later he became a herder of the Texas cattle which were owned by the U. S. Indian Agency nearby, and, in this way, was enabled to save the money which gave him a medical education. In 1877 he graduated at the College of Physicians and Surgeons, at Keokuk, Iowa, and in 1884 at the College of Physicians and Surgeons of Chicago. For twenty-seven years he practiced at Wells. He married on Oct. 22, 1879, a Miss Ella Heffron. After her death he married Miss Mary Perrigode Runo, a lady of French extraction. She died about fifteen years ago. For the last few years Dr. Mikkelsen had been living in retirement and in very feeble health. He died Jan. 8, 1919, from pneumonia.

ELLSWORTH HAZEN NOBLE. A homeopathic ophthalmologist and oto-laryngologist, of Elmira, New York, well known locally. Born in 1866, he graduated from the Columbia College of Pharmacy in 1886 and from the New York Homeopathic Medical College in 1890. For about twenty years he practiced in Elmira. He died at his home in Elmira March 6, 1919, from acute gastritis, and was survived by his widow, who, before her marriage to Dr. Noble, was Miss Florence Loughhead, of Elmira.

SAMUEL LEO OREN. A young ophthalmologist and oto-laryngologist of Lewistown, Ill., who gave much promise. He was born at Laporte, Ia., on Oct. 1, 1879. Having attended Upper Iowa University at Fayette, Ia., he entered the Barnes Medical College, at St. Louis, Mo., at a very early age, and there received his medical degree in 1899, being only twenty years old. Later he took a year's graduate course in the medical department of the Iowa State University, at Iowa City, Ia.

For a time he practiced at Davis, Ill., but removed to Lewistown on Jan. 1, 1903, where he formed a partnership with his father, Dr. S. A. Oren. He married, in 1904, Miss Helen A. Wise, of Davis, Ill. He received his commission as first lieutenant in the medical corps of the U. S. Army on Aug. 18, 1917, and embarked for overseas in July, 1918. He died on duty in France, Oct. 9, 1918, presumably of collapse following ambulatory typhoid fever, and was buried with military honors in an American graveyard at Clermont-Ferrand, France.

JAMES MORRISON RAY. A well known ophthalmologist of Louisville, Ky. He was born Aug. 10, 1860, at Bloomfield, Nelson Co., Ky., son of Isaac N. and Ruth (Bodine) Ray, and nephew of the celebrated Dr. James M. Bodine. He received the medical degree at the University of Louisville in 1882, and, after a brief period of general practice, went to New York, where he studied the eye, ear, nose and throat in the Manhattan Eye and Ear Hospital. While in this institution he was assistant to the famous Dr. Cornelius Rea Agnew.

Returning to Louisville in 1885, Dr. Ray settled in that city as ophthalmologist and oto-laryngologist, and was immediately afterward appointed a clinical assistant in ophthalmology, otology, and laryngology in the Medical Department of the University of Louisville. He afterwards studied the eye, ear, nose and throat in Paris, London, and Vienna, and, returning to Louisville, was awarded the full professorship of opthalmology in his alma mater. When the various Louisville schools merged with the Medical Department of the University, Dr. Ray was elected chairman of the medical faculty, a position which he held till his

death. He was ophthalmic surgeon to the Louisville City and to the SS. Mary and Elizabeth Hospitals, a member of the American Ophthalmological Society, a delegate to the International Medical Congress at London in 1913, and a Fellow of the American College of Surgeons. He was a Baptist.

Dr. Ray never married. He died in Louisville, Oct. 11, 1918, of chronic Bright's disease, survived by only two near relatives, sisters—Mrs. Sam Fulton, of Florida, and Mrs. Kate Wilson, of Louisville.

Dr. Ray was a large, stout man, of a fair complexion, and with gray eyes and brown hair. He wore as a rule a mustache. Concerning his mental characteristics a friend has written as follows: "It was said of him that his assiduity to and love for his profession served as an inspiration to the younger generation of physicians in Louisville. A gruffness of manner, which, however, was only a cloak which concealed a generosity of heart unequalled in Louisville. This, it was said, was the outstanding feature of his unique personality. Even to those he loved most, this characteristic was most apparent, and it was something which those who met him casually never failed to remark. This trait of gruffness concealing over-generosity, as it was characterized, was something to which hundreds of persons to whom he had given the best of his skill in the alleviation of disease and suffering might testify. Many of these never received a bill from him. Others, it is said, were made everlastingly grateful by a modest charge from an unusually able specialist.

Richard Andrews Reeve was a prominent Canadian ophthalmologist. Born in Toronto in 1842, son of William R. Reeve, he received the degree of B. A. at Toronto University in 1862, winning the silver medal in Natural Sciences. In 1865 he received the M. D. at Queen's University, Kingston, and, again, in 1889, at the University of Toronto. He became a Fellow of the Royal College of Physicians and Surgeons in 1866.

From 1865 until his death he seems to have practiced continuously in Toronto, excepting when engaged in study for the *ad eundem* degree. In 1867 he began to devote his attention exclusively to diseases of the eye and ear.

For many years he lectured on ophthalmology in the Toronto School of Medicine, and, from 1885 until his death, on ophthalmology and otology in the University of Toronto. In 1890 he was chosen dean of the medical faculty, a position which he resigned in 1908. He was made chief of the eye department in the Toronto General Hospital in 1907. He was also, for a time, a member of the Toronto University Council and of the Board of Regents of Victoria University.

Dr. Reeve was once president of the Canadian Medical Association, and was president of the British Medical Association when it met at Toronto in 1906. He was a delegate to the British Medical Congress in 1910 and from 1904-7 president of the University Alumni Association. He was also a Fellow of the American College of Surgeons.

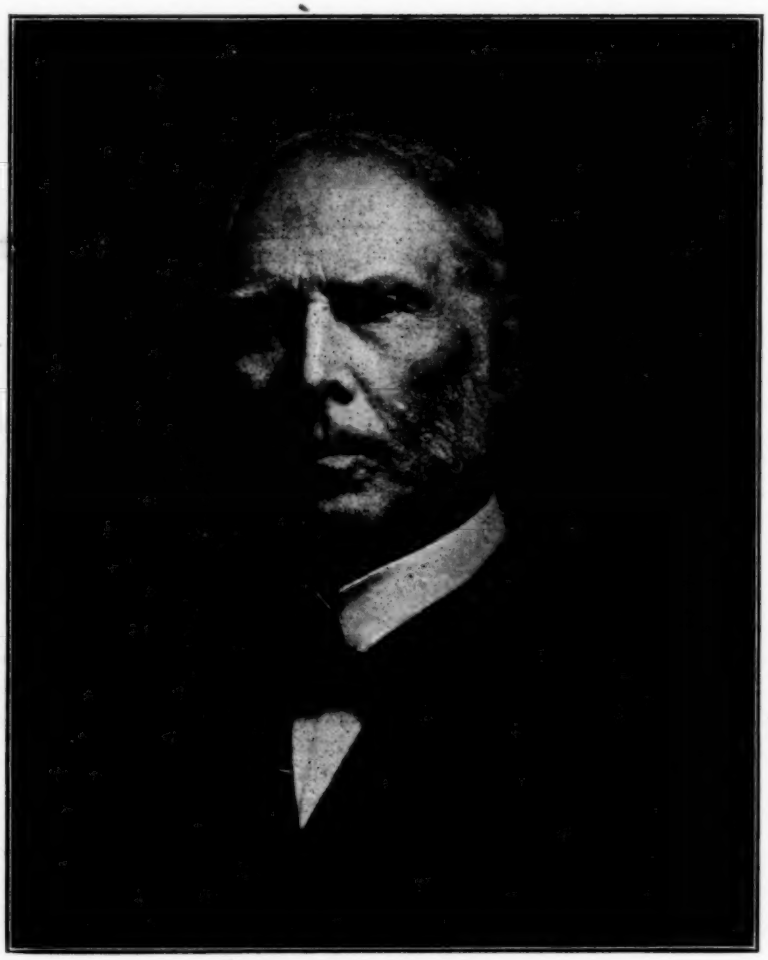
Dr. Reeve died suddenly on Jan. 27, 1919, at Harbord Street and Spadina Avenue, Toronto. He was an active member of the Central Methodist Church. Mrs. Reeve had died about two years before, and the only surviving relatives are two sisters and a brother, Dr. J. Reeve, of Deland, Florida.

Concerning the personality of Dr. Reeve, a writer in "The Canada Lancet" gives us the following: "His was one of those quiet, subtle influences that took a hold of one; and once it laid hold, grew. No one ever heard a rude or coarse remark fall from his lips. He was most deferential to the opinions of others, ever seeking to promote the welfare of his profession, always ready to act in any capacity, his confrères sought his aid, and always displaying a keen insight into the questions brought before him. His humor, too, was of the most delightful character . . . Dr. Reeve was both an example and an inspiration. He be-

longs to the future as well as the past."

ABRAHAM SACHS. An eye, ear, nose and throat specialist of San Antonio, Texas. Born in Austria, Mar. 1, 1872, he received his medical degree at the Miami Medical College, Cincinnati, in 1900. At first he practiced in Cincinnati, then in Chicago, but at length, in 1906, removed to San Antonio. He was a brother of Harry Millard Sachs, a noted actor. He was asphyxiated at his residence on the evening of Jan. 19, 1919, by gas fumes in his bath room.

CHARLES HENRY WEINTZ. An ophthalmologist of Cincinnati, O. Born in 1870, he received the medical degree at the Miami Medical College, Cincinnati, in 1909. He was assistant to the chief of the nose and throat department of the base hospital at Chillicothe, O., under Dr. C. R. Holmes. Dr. Weintz died at Camp Sherman, Oct. 14, 1918, of pneumonia.



Richard Andrews Reeve, 1842-1919.

CORNELIUS WILLIAMS. A well known ophthalmologist of St. Paul, Minn. Born in Kentucky in 1848, he removed in 1864 to Minnesota but later returned to Kentucky. His medical degree was received at the College of Physicians and Surgeons in the City of New York in 1874. Having studied ophthalmol-

ogy and oto-laryngology and practiced both these specialties in New York City for a number of years, he removed in 1882 to St. Paul. In 1901 he was president of the Ramsey County Medical Society. At some time in his career he was admitted to the Minnesota bar, and, on a number of occasions, conducted his own lawsuits—each time, it is said, successfully. He died at St. Luke's Hospital, St. Paul, Dec. 30, 1918, aged 70 years. He was survived by one son.

JESSE SYDNEY WYLER. A celebrated ophthalmologist of Cincinnati, O., who died young, but who had given much promise of great things. He was born at Cincinnati, Sept. 7, 1879, son of Isaac A. and Adelaide (Lowman) Wyler. His medical degree was received at the Miami Medical College in 1904. After serving as interne in the old City Hospital, he continued his studies in Europe. Returning to Cincinnati, he soon was widely known as a skilful operator. He was elected to the staff of the Cincinnati General Hospital in 1910 and to the staff of the Jewish Hospital in 1912.

Dr. Wyler was of medium height, smooth-faced, of a ruddy complexion and with bright brown eyes and hair. He was gay and genial, very fond of children, a collector of books, a Republican, not a religionist but a Jew by birth. He married, Nov. 30, 1908, Miss Florence Iglauer, by whom he had two children. He died at Cincinnati, Oct. 28, 1918.

Concerning the personality of this very able man, we are glad to quote the following from Dr. Derrick T. Vail, who knew him intimately: "Dr. Wyler was one of those enthusiastic, active, able and gifted men who studied ophthalmology not of necessity, for he came from a family possessing ample means, but because he was ambitious and had a natural desire for a scientific and professional career. He did not, therefore, declare himself an ophthalmologist or begin practicing before he was properly equipped.

"He possesed a fine education, spoke the German and French languages fluently, also had a reading knowledge of Spanish and Italian. He was actively connected with the American Journal of Ophthalmology on the staff of collaborators. Dr. Wyler enjoyed the high esteem of a wide circle of friends both in the profession and out of it. His mind was overflowing with information for he was a keen observer, a good student and had strong convictions for or against the many ophthalmological problems. He was fond of an argument and always believed he was right but was never obnoxious in his manner. He was a very skilful operator. His methods were largely of the Viennese school.

"He was of medium height and since he was approaching forty was beginning to show some of the increased heft of body. He had a high forehead, a strongly intellectual countenance, a winning smile and an ingratiating manner which distinguished him.

"His prewar admiration for the Vienna and Berlin schools of ophthalmology was very great. After our country became involved in the war, however, Dr. Wyler's patriotism and loyalty to our country were very keen and genuine. President Dabney of the University of Cincinnati has testified he died in the service of our country.

"He had a very large and select practice, which however did not in the least prevent his giving full time to his hospital clinic which he thoroughly enjoyed. He was very kind and liberal to the poor, and would give them his best time and services without stint. He was just rounding into the climax of a glorious career when stricken with pneumonia following influenza."

[NOTE.—Dr. Charles O. Zahn, noticed in this department in the February number, as we have been informed, was not an ophthalmologist.]

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply the news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. Geo. H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C. Volunteers are needed in other localities.

DEATHS.

Emmet V. Ball, of Atlanta, Ga., of heart disease, aged 48 years.

Edward W. Dean, of Pittsburgh, Pa., of pneumonia, aged 69 years.

Mortimer Frank, of Chicago, of cerebral hemorrhage, aged 44 years.

The death is announced of Sir James MacKenzie Davidson, the pioneer of applied radiology in its relation to ophtholmology, at the age of 63. He was at one time ophthalmic surgeon to the Royal Infirmary of Aberdeen. Later, in London he invented the precise method of localization of foreign bodies in the orbit, by means of the X-ray.

The recent death of Dr. A. J. Stewart, of Provo, Utah, is announced; age 46.

PERSONALS.

Dr. Duverger, Ophthalmologist to the Limoges Hospital, France, and professor in the School of Medicine, is assigned to take charge of the Ophthalmic Faculty at Strasbourg.

The editor of this page recently spent six weeks in California. Several things were indelibly impressed upon his memory. One was that the California oculists are a royal lot of fellows. Another was that California is a delightful place in which to spend a vacation, so fascinating that if April and May are fair samples of their climate, it will be only a matter of time until the state will be too small to hold the population.

Dr. Frank C. Parker, Norristown, Pa., has succeeded Dr. W. C. Posey in the position at the Wills Eye Hospital, Phila., formerly held by Dr. Posey.

COMING MEETINGS.

The Pacific Coast, Oto-Ophthalmic Society will meet at San Francisco, August 4-7.

The Colorado Congress will be held in Denver, August 4-5, and will include both ophthalmic and oto-laryngologic papers and discussions.

The American Academy of Ophthalmology and Oto-Laryngology, will meet at Cleveland, Ohio, Sept. 1-3.

The Oxford Ophthalmological Congress, Oxford, England, July 10-12.

MILITARY NOTES.

Lieut. Col. Nelson Miles Black of Milwaukee has received his discharge from the Army.

Dr. Frederick E. Woodruff of St. Louis has been discharged from the Service.

Dr. H. H. Stark has been discharged from the Medical Corps of the United States Army and has resumed his practice at El Paso, Texas.

Lieut.-Col. Gustavus I. Hogue, of Milwaukee, Wisconsin, writes from Paris, France, that he expects to return soon to America.

Lieut. Col. Sir James Barrett, in the British Service, has returned to his home in Melbourne, Australia.

Col. Walter R. Parker, who was in charge of the department on the Surgery of the Head, at Washington, during our entire period in the war, has been discharged from the Service and has resumed his practice in Detroit.

Dr. Harry Vanderbilt Wurdemann, Seattle, Washington, has been released from army service, as chief of the Eye, Ear, Nose and Throat Section of the Base Hospital, Camp Lewis, Washington, and has returned to civil practice.

Dr. J. W. Thompson, who has been connected with Evacuation Hospital Number 17, located at Vladivostok, Siberia, has returned to Pueblo, Colorado, where he will resume the practice of ophthalmology, in association with his brother, Dr. H. M. Thompson.

Dr. Chas. A. Bahn of New Orleans, Ophthalmologist with Base Hospital 24, Tulane University, is one of the few members of the Unit who are still in France. He has recently been made major and is detailed to the Army Educational Commission in Paris.

Capt. J. M. Shields has been discharged from the Service and will locate in Denver and confine his practice to ophthalmology. He was Ophthalmologist to Base Hospital Number 102, which was assigned to duty with the Italian Army.

Capt. C. E. G. Shannon, an associate of Dr. Howard Forde Hansell, Professor of Ophthalmology, Jefferson College of Philadelphia, received his discharge from Government Serv-

ice April 28th, and has resumed his practice at 1633 Spruce street.

Lieut. Col. de Schweinitz of Philadelphia was returned from Government Service on April first and has resumed private practice at 1705 Walnut street. On April twelfth Dr. de Schweinitz received his commission as Colonel in the Medical Section of the Officers' Reserve Corps, U. S. A.

Surgeon General Merritte W. Ireland was the guest of honor at a reception given under the auspices of the Philadelphia Medical Club at the Bellevue-Stratford Hotel on Friday evening, April 18th, which was attended by five hundred medical men. The reception was preceded by a dinner at the Union League, given in honor of General Ireland by Dr. G. Oram Ring, President of the Club.

Casey A. Wood has been made a full Colonel but he takes the honor so gracefully that his friends still continue to call him "Casey" as of old. A recent visit to him at Palo Alto, California, found him buried in his literary work, but ready to lay it aside long enough to show us the beautiful country in which he is working. He knows the name of every tree, shrub, flower and bird in and about Palo Alto, and it was a rare pleasure to have him to point them out.

Major George F. Suker, until recently in charge of the Eye, Ear, Nose and Throat Service at the Walter Reed General Hospital has resumed private practice at 25 E. Washington, Chicago.

Lieut. W. E. Carson, formerly in charge of ophthalmology at the U. S. N. Hospital, Great Lakes, has been ordered to inactive duty.

Lieut. Col. J. M. Farrell, head of the Spanish-American War Veterans, has returned from France with Base Hospital No. 81.

Major Ira H. Dillon, Bucyrus, Ohio, formerly Chief of Section of Surgery of the Head, Camp Bowie, Texas, has been discharged from service.

SOCIETIES.

The Pacific Coast Oto-Ophthalmological Society will meet at San Francisco August 4, 6, 7. The headquarters will be at the St. Francis Hotel. Dr. Cullin F. Welty is president and Dr. A. S. Green, secretary. A very interesting program has been prepared and a good time generally is predicted.

Dr. Samuel D. Risley has been invited by the special section of the Ohio State Medical Society to present the address in Ophthalmology at the meeting of the section, occurring May 6th, 7th and 8th, at Columbus, Ohio. Dr. Risley will be the guest of honor at a dinner given by Dr. John Edw. Brown at the Columbus Club, during his visit to the Middle West.

On May 15th last the Buffalo Ophthalmological Club had its last meeting during the season. After a subscription dinner, Dr. J. G. Dwyer, the guest of honor, gave a paper under the title, "The Relative Importance of the Teeth, Tonsils and Intestinal Tract in the Production of Focal Infections of the Eye with Especial Reference to the Intestinal Tract." It seems that Dr. Dwyer has made a step forward in elucidating many hitherto very obscure ocular conditions which baffled our therapeutists. The members present, twenty-five, including some out-of-town guests, enjoyed the presentation very much, and a lively discussion showed their interest.

At an interesting program of the Eye, Ear, Nose and Throat Section of the Illinois State Medical Society, which met at Peoria, May 20-22, papers were read by Dr. Willis O. Nance, of Chicago, on "Serpiginous Ulcer of the Cornea"; Dr. H. H. Brown, on "Various Types of Myopia"; Dr. A. L. Adams, Jacksonville, on "The Illinois Institution for the Blind"; Dr. H. W. Woodruff, Joliet, on "Glaucoma"; Dr. John R. Hoffman, on "Binocular Cataract Operations"; Dr. P. C. Matheny, Galesburg, on "Is Malaria an Etiologic Factor in Iritis"; Dr. Alfred N. Murray, Chicago, on "Iritis"; Dr. T. Faith, Chicago, "Early Extraction of Traumatic Cataracts"; Dr. E. R. Crossley, Chicago, "Eye Involvements Following Focal Infections"; Dr. E. E. Edmondson, Mt. Vernon, "Radium in Eye, Ear, Nose and Throat Diseases."

MISCELLANEOUS.

An interesting account of his ophthalmological service in the British army is given by Derby. He found among the alien labor companies that among several thousand Egyptians, nineteen per cent had trachoma; and in upwards of 100,000 Chinese, nine per cent were similarly affected.

After an interval of three years the examination for the Diploma in Ophthalmology at Oxford is to be resumed. The examiners appointed for this year are Dr. G. Mackay of Edinburgh, and Lieut.-Col. A. H. Elliot of London.

Because of their superior sense of touch, Fred F. Bulotin and his wife, both blind, were sworn in yesterday as civilian aids at the Fort Sheridan hospital. Their work will be to massage wounded soldiers. This is the first time in the history of medical reconstruction blind persons have been employed in army hospitals.

The management of the Archives d'Ophtalmologie announces that for the year 1919 the journal will be issued only bi-monthly; but in 1920 they will resume their monthly publication.

The last News Letter published by the National Committee for the Prevention of Blindness shows a widespread interest in the passage of laws by many states for the prevention of ophthalmia neonatorum and trachoma. Several states have Commissions for the Blind which are doing excellent work. The Field Secretary of the National Committee is out on an educational campaign to see that the laggard states are brought into line in these modern methods of ocular prophylaxis.

OPHTHALMIC LITERATURE

These lists contain the titles of all papers bearing on Ophthalmology received within the preceeding month. These titles are all in English, some of them modified to indicate more clearly their subjects. These subjects are grouped under appropriate heads, the succession of groups being the same from month to month. In the group the papers are arranged alphabetically usually by the name of the author in heavy-face type. After the subject of the paper (Ill.) indicates the number of illustrations. (Pl.) the number of plates, and (Col. pl.) colored plates illustrating the article. (Abst.) shows that it is an abstract of the original article. (Bibl.) tells that the paper is accompanied by an important bibliography. (Dis.) means that a discussion of the subject is published with it. Under Repeated Titles are indicated additional publication of papers already noticed. To secure the earliest possible notice writers may send copies of their papers, or reprints, to 318 Majestic Bldg., Denver, Colorado.

DIAGNOSIS.

Bartok, E. Simulation of Unilateral Blindness or Weak Sight? Zeit. f. Augenh., v. 35, pp. 44-46.

Birch-Hirschfeld, A. Method of Determining Visual Acuity in Simulation and Exaggeration. Zeit. f. Augenh., v. 37, pp. 289-293.

Blondel. Produced Diplopia in Diagnosis. Ann. d'Ocul., v. 156, p. 180.

Goldmann, R. Caloric Irritation of Ear a Means of Detecting Simulated Blindness. Zeit. f. Augenh., v. 37, pp. 77-82.

May, C. H. Electric Ophthalmoscope Mirror. Amer. Jour. Ophth., v. 2, p. 367.

Photometry. Brit. Jour. Ophth., v. 3, p. 207.

Von der Heydt, R. Fundus Pathology with Red-Free Light of Vogt. (4 ill.) Amer. Jour. Ophth., v. 2, pp. 334-336, and 351.

Repeated Titles. **Rasquin.** (v. 1, p. 540) Amer. Jour. Ophth., v. 2, p. 293.

THERAPEUTICS.

Bach, H. Light Management of Eye Diseases. Zeit. f. Augenh., v. 37, p. 244-246.

McIlroy, J. H. Methylene Blue in Purulent Discharge from Eye Socket. Brit. Med. Jour., April 5th, 1919, p. 405. Abst. Jour. A. M. A., v. 72, p. 1396.

Schanz, F. Bach's Light Therapy. Zeit. f. Augenh., v. 37, p. 246.

Repeated Titles. **Frias Onate.** (v. 2, p. 171) Amer. Jour. Ophth., v. 2, p. 293.

OPERATIONS.

Gwathmey, J. T., and Karsner, H. T. General Analgesia by Oral Administration. Abst. Brit. Jour. Ophth., v. 3, p. 214.

Löwenstein, A. Tongue-Shaped Flap with Interrupted Suture to Relieve Tension, after Kuhnt's Operation. (2 ill.) Zeit. f. Augenh., v. 38, pp. 191-192.

Pichler, A. Delicate Suture for Epithelial Stitch. Zeit. f. Augenh., v. 38, p. 202.

Seidel, E. Local Anesthesia or Nerve Conduction Anesthesia. (Bibl.) Zeit. f. Augenh., v. 35, pp. 87-93.

Ziegler, S. L. V-Shaped Iridotomy. Amer. Jour. Ophth., v. 2, p. 290.

Repeated Titles. **Macphail.** (v. 1, p. 811) Amer. Jour. Ophth., v. 2, p. 361.

REFRACTION.

Descola. Myopia. Ann. d'Ocul., v. 156, pp. 166-180.

Ergglet, H. Anisometropia; Experimental Observations. (9 ill.) Zeit. f. Sinnesphys, v. 49, p. 326. Abst. Klin. M. f. Augenh., v. 57, p. 406.

Espino, J. M. Cycloplegia after Diphtheria. Rev. Cubana de Oft., v. 1, p. 71.

Gardiner, E. J. An Old Time Victim of Ametropia and a Modern Instance. Jour. Amer. Med. Assn., v. 72, p. 1439.

Henker, O. Accurate Measurement of Eye Glasses and Mountings. (2 ill.) Zeit. f. Augenh., v. 38, pp. 212-220.

Howard, J. R. New Form of Bifocal Lens. Brit. Jour. Ophth., v. 3, p. 236.

Koster, W. Congenital, Buphthalmic, and Cyclitic Myopia. Zeit. f. Augenh., v. 35, pp. 12-26.

Levinsohn, G. Myopia. Zeit. f. Augenh., v. 35, pp. 243-248.

Lüdemann, A. Hydrodiascope or Contact Glass for Correction of Keratoconus. Zeit. f. Augenh., v. 37, pp. 267-289.

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